





# SAJOUS'S ANALYTIC CYCLOPEDIA OF PRACTICAL MEDICINE

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SUPPLEMENT



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## PREFACE

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IN the preparation of this SUPPLEMENT to the Tenth Edition of Sajous's Analytic Cyclopedia of Practical Medicine, the present Editors have been fortunate in being able to profit from the experience of their predecessor in the publication of the earlier Supplements. At the outset, therefore, they wish to acknowledge freely the debt which they owe to that distinguished clinician, author and editor, the late Dr Charles E. de M. Sajous, who for so many years rendered such signal service to the medical profession of this country. To him belongs the credit for founding and developing the Cyclopedia proper, and for planning and compiling the numerous Supplements that have added so much to its usefulness.

In the present SUPPLEMENT the general arrangement which was found so satisfactory to the earlier ones has been closely followed. The various subjects discussed have been arranged in alphabetic sequence, laboratory tests, case reports, drugs, and certain other material have been placed in small type, while therapeutic procedures have been emphasized by the use of bold type.

In this SUPPLEMENT we are presenting the important advances in the various fields of medicine and surgery that have taken place since the issuance of the previous Supplement. It has not been our aim to cover completely the entire medical literature for these years, since, obviously, this would be impossible. Our object has been to carry out a critical survey of the literature of the past two years, selecting for discussion and comment those subjects which seem to be of outstanding practical importance, or in which noteworthy advances have occurred. In order to accomplish this, the services of an Editorial Board have been utilized. This Board, composed of men preeminent in their several specialties, has been able to bring to the arduous task of reviewing the literature in many specialized fields the critical judgment of trained experts. The efforts of this Editorial Board have been further supplemented by a group of reviewers, whose names will be found in the list of Contributors, especially selected because of their knowledge of certain special fields and their fitness to discuss a number of technical subjects. It is hoped that by adopting this plan of having those who are best qualified review the various aspects of medicine, a volume has been produced which will prove authoritative from a scientific standpoint, and at the same time be of distinct practical value.

In conclusion, the Editor wishes to express his appreciation of the unfailing help and cooperation which he has received from the Assistant Editor, Dr Edward L Bortz, as well as from every member of the Editorial Board. All have given without stint of their time, energy and counsel. He is also indebted to the various contributors, whose admirable reviews have added much to the completeness and value of the work. His thanks are especially due Miss L I Weisgerber for assistance in innumerable details and particularly for the preparation of the excellent Index. Finally, the Editor wishes to thank the Publishers for their generous co-operation and for the acceptable manner in which this SUPPLEMENT has been prepared for the Medical Profession.

GEORGE MORRIS PIERSOL

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# SAJOUS'S

## ANALYTIC CYCLOPEDIA

### *of* PRACTICAL MEDICINE

#### SUPPLEMENT

#### A

##### **ABDOMINAL ADHESIONS.**—

Abdominal adhesions, according to A. Ladwig (Arch f klin Chir 151: 1 (July) 1928), are formed in 3 stages. The first stage is the stage of inflammation characterized by exudation of cells and inflammatory edema of the surface of the abdominal viscera. In the second stage, fibroblasts invade the exudate. The covering epithelium of the serous membranes takes part in the formation of adhesions. The third, is the stage of definite formation of adhesions. Muscle fibers are seldom found in the adhesions and nerves are never found. Many surgeons are of the opinion that no fluid or solid formed body, however bland, though non-irritating or sterile, can be placed in contact with the peritoneum without producing tight encapsulation by adjacent loops of bowel or omentum. No method has been developed whereby adhesions between contiguous inflamed loops of bowel and omentum can be prevented. Yates's experimental work in 1905 showed that relative encapsulation, due to the precipitation of fibrin, is immediate, and absolute encapsulation occurs in less than 6 hours. Such bland substances as vaseline, paraffin oil, olive oil, peptonized milk, and egg

albumen not only fail to prevent adhesions but excite their formation and the production of a chemical peritonitis. When a hypertonic solution is brought into contact with the peritoneum it produces a transudate. R. Buchbinder (Surg Gynec Obst 45: 769 (Dec.) 1927) found that a 1 per cent solution of dextrose produced a transudate which, in sufficient amounts, limits or entirely prevents the formation of fibrin. Under such conditions he was able to keep rubber drains of various types unencapsulated and communicating with the free peritoneum for 2 and 3 consecutive days. He attributes the prevention of fibrin formation and subsequent encapsulation to the gradual dilution of the peritoneal exudate. Even after the application of tincture of iodine to produce a chemical peritonitis, by maintaining the transudate by repeated injections of dextrose solution, adhesions between contiguous inflamed loops failed to occur. The method, however, is associated with the danger of serious dehydration, which in some cases may prove fatal. This danger, however, is remote, if the maximum safe dose of a 20 per cent solution—one-fifth of the body weight—is not exceeded.





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### A

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Normal saline solutions should be administered intravenously. The peritoneum is only slightly damaged. Histologically, a mild serous peritonitis is produced. *Glycosuria* is of uniform occurrence but taxation of sugar tolerance is not a source of danger and can be controlled by the administration of **insulin**. In the cases of some of the dogs experimented upon, no harm resulted when the abdomen was filled with fluid and there was a constant glycosuria for a week.

Using concentrated **bovine amniotic fluid**, prepared by a fractional alcoholic precipitation, S. Warren (Arch Path 6 860 (Nov) 1928) found that it reduced the number and extent of adhesions formed, without interfering with normal healing. Apparently, it acts by reducing oozing from injured surfaces, thereby lessening the amount of fibrin formed and also, since it is but slowly absorbed, by lubricating the peritoneal cavity until the danger of adhesions being formed has passed. It may be used in other serous cavities than the peritoneum. The amniotic concentrate is safer, more convenient, and very nearly as efficacious as whole amniotic fluid. H. L. Johnson (New England J Med 199 661 (Oct 4) 1928) also commends the use of **amniotic fluid concentrate**. It is not an irritating or dehydrating agent and the percentage of effectiveness is conservatively estimated at 70. It should only be used in clean cases, and apparently shortens the usual period of distress. From clinical experience it is seen that the use of amniotic fluid in the human abdomen is reasonably safe.

To reduce adhesions after the removal of the gall-bladder, Levy (Physical Therap 47.331 (June) 1929)

uses **infra-red radiation and diathermy**. The treatment is given daily, or at least 3 times weekly. Duodenal irritation seems to be relieved as well as periduodenitis.

### ABDOMEN, INJURIES OF.—

Abdominal injuries occur with or without penetration of the abdominal parietes. The solid parenchymatous organs such as the liver, spleen, pancreas, kidneys, or a hollow viscus, as, for example, some section of the gastro-intestinal tract, its associated mesentery and omentum, the urinary or gall-bladder, may be damaged. Wounds of the solid parenchymatous organs are characterized chiefly by hemorrhage and shock. Those of the hollow viscera are followed by leakage, secondary peritonitis and infection, so that if neglected a fatal peritonitis often ensues.

**LIVER**—Of the upper abdominal organs, the liver is most frequently damaged by traumatism. According to R. Brändberg (Acta chir, Scandnav 63 321, 1928), rupture of the liver which extends as far as the capsule, without causing damage to the latter, should be called subcapsular rupture, instead of the former term subcapsular hematoma. Such injury is relatively common, the symptoms in most cases unimportant, and healing usually occurs spontaneously. Exceptionally, operative interference may be required. In subcapsular rupture, an extensive hemorrhage may occur beneath the undamaged capsule which becomes stretched often to a remarkable extent. A perforation or rupture into the peritoneal cavity may be caused by continued hemorrhage or by the escape of bile. In a central rupture, bile escaping from a larger

bile duct may cause progressive expansion of the cavity. Bleeding of this type apparently almost always ceases from counter pressure. By supervening infection, subcapsular as well as central ruptures may become serious. In a case reported by Paire (Bull et mém Soc nat de chir 55 502 (Apr 20) 1929) 2 bullets produced wounds of the liver, stomach, pancreas, duodenal-jejunal flexure, and the sigmoid. Operation was performed 20 hours later and the patient recovered without primary infection. The wound of the pancreas healed without complications, notwithstanding late surgical intervention, long and difficult transportation, intraperitoneal hemorrhage and widely open wounds of the stomach and intestines.

An unusual *foreign body* left in the liver after injury is reported by S E Perkins (New England J Med 200 494 (Mar 7) 1929). The patient, a boy aged 11 years, struck by an automobile at the level of the seventh and eighth ribs, sustained a torn and punctured wound. He was immediately removed to a hospital and suitable pressure dressings applied. The next morning, exploratory operation disclosed a collapsed lung, the diaphragm torn from the ribs, and the kidney and liver capsule punctured, with a round hole in the liver filled with black clotted blood. The diaphragm was sutured to the ribs, the kidney and liver capsule were stitched and a drain inserted. A septic temperature continued for several weeks and an x-ray examination revealed the presence of a door knob from the automobile within the liver. The patient was discharged from the hospital with the foreign body unremoved, the wound

healed, and having as his only complaint a decided irregularity of the pulse rate.

*Spontaneous rupture* may occur in a diseased and softened liver. Hitzrot divides the condition into (1) True ruptures which involve both capsule and parenchyma, and (2) subcapsular ruptures in which the capsule remains intact.

Rupture of the liver may be complicated by

- 1 Shock, varying from faintness to fatal collapse

- 2 Hemorrhage

- 3 Traumatic infarction due to the impaired blood supply of the edges of deep lacerations

- 4 Central rupture with hematoma formation within the hepatic substance

- 5 Infection and subsequent abscess formation

- 6 Embolism, chiefly of the heart and lungs

- 7 Rupture of vena cava

- 8 Thrombosis of the portal veins

- 9 Peritonitis and other septic complications

**SYMPTOMS** — The chief clinical features of ruptured liver arise from the free hemorrhage into the peritoneal cavity, in addition to the primary shock. The patient becomes pale, weak and later restless and dyspneic. The pulse is progressively more and more rapid and compressible, with finally a marked fall of blood-pressure. On the other hand, H Finsterer, confirmed by G Riccinti (Políclinico sez chir 34 229 (May 15) 1927) has found a relative bradycardia in the hepatic injuries of lesser degree. Riccinti maintains that a slow pulse may exist in spite of internal hemorrhage, which suggests

the probability of injury to the liver. Blood may gravitate to the dependent portions of the abdomen and to the pelvis. Right upper abdominal pain, tenderness and muscular rigidity are usual, and fracture of the ribs or other injury of the overlying abdominal wall may be present. With the disappearance of shock, the subnormal temperature rises to normal. To determine the progress of the case, frequent hemoglobin estimations and erythrocyte counts are desirable. A. M. Wright and E. M. Livingston (New York State J. Med. 23: 286 (July) 1923) have shown that in cases of internal hemorrhage, leukocytosis occurs only if the bleeding takes place into a serous cavity. The elevation of the count begins 1 or 2 hours after the hemorrhage and its maximum is reached in 6 to 10 hours.

In 5 years, among the 3900 accident cases brought into the casualty room at the Winnipeg General Hospital, P. H. T. Thorlakson and A. W. S. Hay (Canad. M. A. J. 20: 593 (June) 1929), found only 3 cases of ruptured liver. It was shown that roughly for each hour's delay the patient's chances for recovery are diminished by 2 to 5 per cent. After a delay of 72 hours, operation is usually contraindicated, as it will probably hasten the end of an already moribund patient, or retard the recovery of a less severely injured patient, on whom an operation is unnecessary. The general mortality from the operations was 37.5 per cent, the chief causes of death being multiplicity of injury and the length of interval between the injury and operation.

L. Grimault emphasizes the fact that marked abdominal rigidity of general board-like character (Bull. et

mém. Soc. nat. de chir. 53: 1107 (Oct. 29) 1927) results from the presence of intra-peritoneal blood. The point is made in order to combat the erroneous opinions of other observers. H. M. Elder's patient (Canad. M. A. J. 19: 456 (Oct.) 1928), a boy aged 10, who had been run over by an automobile, had not only lacerations of the quadrate lobe of the liver and longitudinal sulcus which were controlled by mattress sutures of catgut, but also 3 intussusceptions of the small intestines which were milked out. The patient after a stormy convalescence recovered.

**DIFFERENTIAL DIAGNOSIS** — A history of an injury of the upper abdomen, especially on the right side as from a fall, a blow, or a crush between 2 hard bodies, is important. There is shock, progressive diminution in red cells and hemoglobin and an increase in leukocytes. Injury to the lungs, as suggested by P. H. T. Thorlakson and A. W. S. Hay (Canad. M. A. J. (June) 1929), is to be ruled out by the absence of fracture of the ribs, hemoptysis, dulness over the thorax or abnormal breath sounds. Rupture of the stomach is usually associated with severe epigastric pain and vomiting and perhaps hematemesis. There is evidence of free fluid or gas within the abdominal cavity. In rupture of the kidney the pain and mass are localized to the loin and lumbar region and there may or may not be urinary changes. In the rupture of the bladder, the hydrostatic test and presence of blood stained urine is significant. The symptoms from rupture of the spleen are almost identical and the treatment is about the same as for ruptured liver. The hemorrhage, however, is usually more

severe, the injury involves the left upper abdomen and there may be evidence of splenomegaly

**TREATMENT** should first be directed against any associated severe shock but stimulants should not be used. **Transfusion** may be desirable. Prompt operation is most important if the liver has been ruptured. On opening the abdomen, temporary arrest of bleeding is effected by compressing the portal veins and the hepatic artery in the gastro-hepatic omentum, just in front of the foramen of Winslow by the finger and thumb, or by the continuous use of a rubber covered clamp. Bleeding should be controlled by packing with gauze or by suture. Gauze favors the production of adhesions, and secondary hemorrhage may occur even though the packing is retained for 4 or 5 days and then gradually removed. On the other hand, suture may be difficult on account of the site of the tear or the friability of the liver tissue. With a small rent it is often very useful. When the bleeding is not very profuse, cauterization may occasionally be tried, although it involves the danger of secondary bleeding as the coagulated tissue begins to slough. An upper right transverse incision is useful.

**SPLEEN**—Injuries of the spleen are only second in frequency to those of the liver. Most common is the transverse rupture at the hilum. A transverse rupture of the superior surface, crushing by fractured ribs and tears of the splenic substance also occur. Spontaneous rupture occurs when the organ is enlarged and softened or brittle from coughing, sneezing or laughing. M P Susman (Brit M J 15 47 (July) 1927) re-

ported 1 case and collected 6 others from the literature. In the case of T W Harvey, Jr (J A M A. 93 987 (Sept 28) 1929), a man of 44 years, while seated at his desk, developed intense pain in the abdomen. He had eaten a light lunch and coughed slightly once, but had not coughed afterward. The symptoms came on without warning, exertion, coughing or sneezing. The pain in the upper abdomen was agonizing, the abdominal walls rigid and acutely tender without distention. Under a diagnosis of ruptured duodenal ulcer, the abdomen was opened and a ruptured spleen removed, with recovery. The ruptured spleen may involve both the capsule and parenchyma or the parenchyma only.

Complete separation of the spleen from the splenic pedicle, the spleen being free in the abdominal cavity, is reported by Millan (Edinburgh M J 35 21, 1928), the patient recovering after immediate laparotomy and ligation of the pedicle.

A *spontaneous rupture* of the spleen occurring in a man of 25 years is reported by J S Rhame (Ann Surg. 88 - 212 (Aug) 1928). A ragged tear was present in the capsule of the spleen and when splenectomy was performed, thrombosis of the veins was discovered. Attention is directed to the fact that spontaneous rupture of the spleen is more apt to occur when the spleen is engorged during digestion. Spontaneous rupture of the spleen, caused by duodenal ulcer is reported by F Demmer (Wien klin Wchnschr 40 1443 (Nov 17) 1927) in a man 43 years of age, who had gastric symptoms for 15 years. In this case, about 1¼ liters (quarts) of blood were removed from the peritoneal

cavity, mixed with sodium chloride solution and reinfused through a vein in the abdomen, while the abdomen was being closed after the splenectomy. The hemorrhage is ascribed to the mechanical pressure on the splenic vein, constricted by pancreaticoduodenal adhesions from the old duodenal ulcer. The patient recovered. Central contusions from hematomata may be followed by secondary rupture of the blood in the peritoneal cavity, with serious intraperitoneal hemorrhage. Such injuries have been termed 2-stage ruptures. Similar symptoms occur with small ruptures with repeated or recurrent hemorrhage on exertion or movement. Pain is usually referred to the upper left abdomen but later becomes generalized. Vomiting is usual and abdominal rigidity is marked. There is tenderness, and percussion shows dulness radiating from the spleen and gradually increasing in extent, especially in the left flank, followed by symptoms of hemorrhage such as pallor, rapid, weak pulse, leukocytosis and other blood changes. Spontaneous rupture from thrombosis of the splenic vein, secondary to carcinoma of the pancreas occurred in S H Gray's case (Arch Path 6 433 (Sept) 1928).

Thirty-two cases of splenic injury are recorded by J F Connors (Ann Surg 88 388 (Sept) 1928). Motor accidents accounted for 18 of these, while 22 occurred in persons under the age of 21. Of these cases, 25 were male and 7 female, and in all but 1, the injury involved a normal spleen. The laceration either divided the spleen in 2 parts or was of a stellate character. Recovery took place in 15 patients, all as a result of operation,

and 7 without operation died. The operative mortality was about 40 per cent. The treatment was immediate operation. It is rarely advisable to wait for the subsidence of shock. As soon as the bleeding is controlled, a subcutaneous saline infusion or blood transfusion is given.

**TREATMENT**—O C Straus and I H Tumpeer (S Clin North America, 9 345 (Apr) 1929) commend a mid-line incision made above the umbilicus with a transverse extension through the left rectus muscle parallel with the intercostal nerve. The operation of choice is splenectomy which is followed by slight anemia, persistent for years, with a slight leukocytosis, but without adverse effect upon growth, health or resistance to infection. If the spleen is sufficiently firm and the rupture superficial, suture may be tried, and for small superficial wounds, gauze packings are occasionally effective. For complete exploration of the spleen, it is necessary to divide the gastrosplenic and phrenicosplenic ligaments, but this renders the spleen so mobile that there is danger of torsion and necrosis unless the organ is removed.

An osteoplastic or chondrioplastic resection of the costal arch, according to H W Meyer (Surg Gynec Obst 48 412 (Mar) 1929), is commended as a great help in obtaining adequate operative exposure in operations upon the spleen, as well as for certain operations on the diaphragm, liver and the cardiac portions of the stomach. The attachments to the diaphragm are not interfered with and the secondary union of the costal arch is firm.

**PANCREAS**—*Rupture* of the pancreas is relatively rare but, according

to Bosch, slight injury occurs more frequently than is recognized. Traumatic lesions usually involve the tail of the pancreas. Complete rupture of the pancreas is ordinarily fatal, although prompt suture and tamponade may avert this disaster. The case reported by L. Aurousseau and M. Armingeat (Bull. et mém. Soc. nat. de chir. 54: 1370 (Dec. 15) 1928), in a girl aged 4 years, struck by an automobile, was found at operation to have a tear 2 cms. long in the spleen and a vertical rupture of the whole width of the pancreas. The spleen was removed and the wound in the pancreas sutured with recovery.

A successful end-to-end suture of a traumatic tear of the pancreas is also reported by A. Newton (Surg. Gynec. Obst. 48: 808 (June) 1929). The pancreas was not only sutured but the suture lines were surrounded by a strip of omentum about 2 inches in width. Ten days later a swelling in the upper abdomen appeared and suddenly increased until it produced respiratory difficulty. About a month later it was opened and found to contain 2 pints (1 liter) of clear fluid and the patient made a good recovery. A *pseudo-cyst* of the pancreas developing in a man of 35 years, after his upper abdomen had been squeezed in an accident, is reported by Paire and Courboulès (Bull. et mém. Soc. nat. de chir. 55: 494 (Apr. 20) 1929). The patient recovered after drainage of the cyst. On suturing the pancreas, great care should be taken to prevent secondary leaking from the duct and the possible formation of the very troublesome pancreatic fistula, or a cyst.

Three kinds of cysts have been described

(1) Para-pancreatic cysts, which are diagnosed by swelling of the epigastrium and evidence of disturbance of pancreatic function, including loss of weight, anorexia, constipation, glycosuria and fatty stools. In this condition, erosion in the intestines and subsequent drainage may occur.

(2) Endo-pancreatic cyst, similar to the first, except that it is located within the pancreatic substance.

(3) The third type is produced by fibrous lesion at the head of the pancreas, causing constriction of the larger ducts, and by back pressure initiating the formation of numerous small cysts.

**BLADDER**—The bladder may be wounded by penetration from without, by gunshot, sharp pointed instruments or by perforation from within, as by cystoscope or lithotrite, or wounds, may be due to blows or crushing injuries on the lower abdomen, with or without fracture of the pelvis. Fifty-five cases reported from the Bellevue Hospital by M. F. Campbell (Surg. Gynec. Obst. 49: 540 (Oct.) 1929) gave a mortality of 63.6 per cent, over 90 per cent occur in males. One ruptured bladder was found approximately in 5500 surgical cases admitted to the Bellevue Hospital. The condition is more common in adults, although the youngest patient was a girl aged 3 years. Rupture of the bladder *in utero* has been observed. *Spontaneous rupture* of the bladder has been reported, especially of the diseased distended bladder. Traumatism at times may be slight, as from misstep or slight fall, the exertion of getting out of bed, or more severe, as a suprapubic kick, blow or crushing pelvic injury. The bladder may rupture during labor, straining at

stool, or on lifting heavy weights. Of the predisposing qualities, alcoholism or other forms of mental irresponsibility are most important. A third, or 19 of the patients, suffered vesical rupture during a state of acute alcoholism. One-third of the patients were injured by motor vehicles and about one-half of the patients had industrial accidents, chiefly falls or pelvic crushings. One patient fell 4 feet and died, another fell 8 stories and lived. In 1 of every 7, fracture of the pelvis is associated with vesical rupture.

**SYMPTOMS**—These include shock, one-fourth of the 55 cases brought into Bellevue Hospital being in shock, comatose or moribund. Usually there is marked cardiovascular depression, pallor, feeble or imperceptible pulse and a systolic fluctuation between 50 and 70 mm of mercury, with evidence of internal hemorrhage. Often there is local tenderness, dysuria, hematuria or absolute inability to void. From intraperitoneal rupture, the early symptoms of peritonitis may develop. There is abdominal tenderness and rigidity, followed immediately by nausea and vomiting and distention. On the other hand, an alcoholic or psychopathic patient may walk about for several days, with a ruptured bladder, ignorant of his perilous condition. Pre-intraabdominal fluid was demonstrated pre-operatively in only 7 cases. Extra-peritoneal rupture was found in 21 patients, and intra-peritoneal rupture with free urine cavity in 34.

In the **DIAGNOSIS** the injection of measured amounts of fluid and the estimation of its return should always be tried, although it is not always accurate. In 41 cases, the catheter

was of real diagnostic value in but 13, but in nearly all, bloody urine was withdrawn. In 2 cases the catheter apparently drained a bloody peritoneal cavity. If the patient's condition permits, cystoscopy is desirable, although it may be impracticable on account of severe bleeding. Pneumoradiography, as suggested by Vaughn and Rednick, is more accurate, 50 to 100 cc of air being injected into the bladder, and lateral abdominal x-rays are then taken. The blood shows a low and falling red cell count and hemoglobin, usually with polymorphonuclear leukocytosis.

**TREATMENT** is immediate abdominal exploration and suture, followed by the use of an in-dwelling catheter.

**ABORTION.—INCIDENCE.**—Widespread interest, both on the part of the public, and the medical profession, is being manifested more and more in all phases of abortion. Owing to the untoward economic conditions in Europe following the war, it has been asserted that criminal abortion is 5 times more frequent than it was prior to 1914. Efforts have been put forth to curb the situation by legislative action.

From a study made by G. Gellhorn (*Am J Obst and Gynec* 16:547 (Oct) 1928), it was disclosed that a steady rise in the frequency of abortion in all countries has been going on during the past 3 decades, but more especially during the last 10 years.

In spite of the availability of contraceptive information and apparatus, the practice of abortion in most European countries is widely prevalent. The conclusion seems warranted that conception evidently takes



place from the defective methods practised

It is stated, that during 1890, in Germany, 1 abortion occurred in every 10 births. In 1911 the proportion had dropped to 1 in 5. In Hamburg, Germany, in 1919, 1 abortion occurred for every 2 births, while in 1926, it is reported that 2 abortions occurred for every 3 births. In a period of 3 years, 167 women died, in Hamburg, of puerperal sepsis, whereas 376 died from septic infection following criminal abortion. The total number of abortions each year in Germany, is said to be between 500,000 and 875,000. In some of the communities, the death rate following the premature termination of pregnancy, averages as high as 30 to 40 per cent of the total number of maternal deaths.

In Austria, steps have been taken to modify the present law, whereby the interruption of pregnancy is permitted only in conditions endangering the life of the patient.

It is interesting to note, that in Vienna, during the year 1921, illegitimacy was 75 per cent less than in 1884. It is almost entirely absent among the intelligent classes. This is attributed chiefly to the practice of contraception and abortion.

In Russia, abortion during the early months of gestation is actually legalized. A patient who wishes to have her pregnancy terminated, applies to a commission made up of an accredited physician, a member of the "Women's Commission," and a member of the "Commission on Mothers and Infants."

The candidates average 4 to 5 children each. Since the inauguration of this policy, the requests of 81

per cent of the women have been considered valid upon which a free operation is performed in an authorized government hospital. In the years 1922, 1923 and 1924, there were 55,320 authorized interruptions with no reported mortality. In the same period there were 66,675 unauthorized illegal abortions with more than 3000 deaths.

The Soviet government is now undertaking a study of birth control as a simpler method for the sick and debilitated mothers. Therapeutic contraception and abortion are receiving organized investigation in order that an authoritative statement of justifiable medical indications might be prepared.

B. Whitehouse (Brit M J 1 1095 (Dec 14) 1929) analyzed the incidence of abortion among 3000 patients in England and found that in a total of 11,430 pregnancies, the percentage of abortions was 17.2. Among the 3000 patients, the percentage who aborted at some time during their child-bearing period was 35.3.

In the United States, the situation is gradually assuming a serious aspect. Attention is directed to the observation that the number of abortions is steadily increasing and that more than 25 per cent of patients give a history of previous abortion, either spontaneous or induced.

Although the etiological factors underlying abortion are numerous, it is generally conceded that 50 per cent of all abortions are brought about by criminal interference, in comparison with which all other causes are insignificant.

Death from infection occurs so frequently that the mortality of criminal abortion far exceeds that of

childbirth in general, not to mention the tremendous toll of morbidity exacted, with its far reaching influence on later life

The effect of artificially induced abortion upon subsequent labors has been studied in a large Russian clinic by S M Klein (Munchen med Wchnschr 74 364 (Mar 4) 1927) He found that induced abortions were followed in later pregnancies by various complications such as adherent placenta, delay in the third stage, abnormal presentation, placenta previa, eclampsia, forceps delivery and post-partum hemorrhage

M Serdukov (Gynéc et Obst 17 196 (Mar) 1928) discusses the effects from the biologic viewpoint Artificial abortion suppresses "the trophic influences of the hormones of the corpus luteum, placenta and fetus and the internal secretion of the uterus" A super-involution of the uterus may result, especially in women of the asthenic infantile type, with consequent sterility, even in the absence of infection

#### BACTERIOLOGICAL ASPECT

—Septic abortion calls for a thorough bacteriological investigation Considerable emphasis has been laid by Schottmuller on the rôle enacted by anerobic bacteria He claims that *Streptococcus putridus* infection, due to anerobic organisms, most frequently follows abortion In a study of 100 cases of infected abortion, Schottmuller found the *Streptococcus putridus* present 29 times, the *staphylococcus* 26 times, and *Bacterium coli* 19 times The widespread belief that the organisms are introduced into the uterus either by instruments or the hands of the accoucheur must be somewhat modified, since the occur-

rence of anerobic streptococci in the normal vagina affords a possibility of autogenous infection

In the infected abortions recorded by this observer, only 3 per cent of the patients died This would seem to indicate that the uterus in early abortion is not so easily infected as at term

The ingress of anerobic organisms in cases of thrombophlebitis is always through the endometrium, uterine wall and parametrium to the thrombosed veins, which offer a fine culture medium The thrombosed vessels in early gestation are small and not numerous, thus contributing to a lower mortality

In 231 deaths from puerperal sepsis, the *Streptococcus putridus* was present 72 times in pure culture and 7 times as a mixed infection, as contrasted with 600 cases of infected abortion in which it was present in pure culture only 4 times and 300 times as a mixed infection

*Focal infection* as a causative factor in the production of abortion has also attracted attention Nickel and Mussey obtained cultures from the tonsils of 1 patient and from the teeth of 3 others who had had abortions In 3 instances injections of these cultures into guinea pigs produced abortion, the causative organism being the *Streptococcus viridans*

Similarly Reith injected the streptococcus viridans, obtained from the tonsils and placenta of a woman who had repeated spontaneous abortions, into 4 pregnant rabbits and produced abortion in all

Vignes reports a case of habitual abortion in which there was an acute decidual infection coexistent with 2 of 4 abortions In the fifth pregnancy,

streptococci were found about the teeth and in the vaginal discharge. An autogenous vaccine was administered to the patient, following which she went to term and delivered a living child.

**SYPHILIS AND ABORTION.**—Until recently it has been taught that syphilis played a prominent rôle in the etiology of abortion. Whitehouse (*loc cit*) quotes the records of the Government Venereal Department in the General Hospital, Birmingham. He found that among 493 patients with tertiary lues, the percentage of abortion was 37.3, or almost identical with the percentage of abortions from all causes, namely 35.3. When stillbirths were included, however, the percentage of dead fetuses rose to 59.4.

Lyon analyzed 1620 consecutive deliveries in the Women's Hospital, New York City, from the standpoint of syphilis as a cause of fetal death. In this series there were 11 cases of abortion. None of the patients, however, showed evidence of syphilitic infection.

These figures tend to refute the prevalent belief that syphilis is a common factor in the etiology of abortion. Syphilis is not often a demonstrable cause of repeated abortion, although it does increase the number of stillbirths and premature labors. After the fourth month, however, when placentation is complete, syphilitic disease may affect the child either directly or secondarily by changes in the decidua.

**ETIOLOGY OF REPEATED or HABITUAL ABORTION.**—The important problem of repeated or habitual abortion calls for an intensive study of the physiologic process of

reproduction as well as the pathological changes due to disease. Detailed researches are being made in this direction in the hope of throwing more light on hitherto obscure abortions.

**MATERNAL ORIGIN.**—It is generally recognized that the factors underlying repeated or habitual abortion may be of maternal, paternal or fetal origin. Briefly considered, disease of the mother, such as acute or chronic infection and kidney or liver toxemia may extinguish fetal life. Local maternal conditions responsible, embrace chiefly decidual endometritis, malformations or sub-development of the uterus, fibroids and polyps. Acute infections with severe pyrexia, hypercarbonization of the blood, as seen in pneumonia and hemolysis in association with anemia, are other causes. Recently, attention has been directed to the possibility of the transmission of *Bang's bacillus* from infected herds to the human pregnant female and a few undoubted cases of this type of infection have occurred sporadically both in England and in Denmark.

The influence of diet upon fertility has been studied by Reynolds and Macomber. The addition or withdrawal of calcium salts from the diet, seemed to have a special influence on the procreative tendency of certain lower animals, notably on the rat.

**"ANTI-ABORTION" VITAMIN E.**—The discovery by Evans and his co-workers, of a substance known as the "anti-sterility" vitamin (fat-soluble E), has evoked additional speculation as to the relation of diet to fertility. In 1922, Evans and Scott first announced the results of their work upon the "existence of a hitherto

unknown dietary factor essential for reproduction”

In 1925, Evans and Burr (Proc. Nat Acad Sci 11 334, 1925) published their observations with respect to this substance which they claim is essential for the continuance of pregnancy. They found that if vitamin E is withheld from the diet of an animal, several months or intercurrent pregnancies are required for the initial quantity to be absorbed. The total deprivation of this vitamin from the diet of rats, did not prevent fertilization, but in those who conceived, abortion took place within the course of 2 weeks. The ingestion of even small quantities of the vitamin, they found, enhanced fertility.

Abortion, it is believed, can be prevented by a diet rich in vitamin E. The substance is found widespread in different foods, and especially in wheat germ, peas, alfalfa, lettuce and other leaves. In wheat, it is stored exclusively in the germ. Ordinary white flour does not contain the substance. It is present in vegetable oil and is found in small quantities in animal tissues and in milk. It is absent from the tissues of animals which have been deprived of this vitamin by some special type of artificial feeding.

It has been suggested that vitamin E should be termed anti-abortion vitamin, rather than anti-sterility vitamin.

If the findings reported by Evans are confirmed, provided of course, the conclusions based on animal experimentation can be applied to the human species, some explanation may be offered for some hitherto obscure cases of early abortion.

Evans refers to a general similarity

in certain chemical reactions between vitamin E and the ovarian hormone. Whitehouse (*loc cit*) has suggested that this similarity may imply that the ovary not only produces the ovum, but also an essential “growth factor,” upon which the future development or death of the ovum with abortion depends.

It seems reasonable to assume, that a diet, rich in vitamin E, together with the administration of calcium lactate or iodine, together with some potent ovarian hormone, may be the path along which the future treatment of *spontaneous abortion* will follow.

**PATERNAL ORIGIN**—The responsibility of the male for the premature expulsion of the ovum, may be dependent first, on a relatively low fertility, second, asthenia from excessive marital relation, third, low virility of the sperm, fourth, chronic drug or chemical poisoning, and fifth, constitutional disease.

**FETAL ORIGIN**—With respect to the embryo itself, Mall claims that from one-third to one-half of the fetuses aborted during the second and third months of gestation, are teratologic, presenting malformations of the chorion, amnion, placenta or evidence of monster formation.

It becomes incumbent, therefore, to study abortive ova from both the gross and histologic aspect.

The earliest as well as the most constant evidence of the pathologic alteration of the chorion, is the presence between the villi of a mucoid substance containing leukocytes and an irregular growth of the syncytium. Cystic degeneration of the chorionic villi is also frequently seen. It may be, that some of the cases heretofore

casually recorded as simple abortions are in reality degenerative molar pregnancies

Meyer looks upon *hydatidiform mole* as the most frequent of all diseases of the early ovum. He claims that from 4 to 10 per cent of all pregnancies are complicated by some degree of hydatidiform degeneration. The determination of the frequency of the condition, he states, depends on the care with which all specimens are examined. In this connection, it may not be out of place to mention that many cases of mole are treated primarily as threatened, or inevitable abortions.

With reference to the amnion, it is of interest to mention that in some cases of aborted ova it is entirely absent. In still others the embryo is destroyed after the development of the amnion, and it may be represented by the stump of the umbilical cord only. Destruction of the ovum may also occur as the result of polyhydramnios, oligohydramnios, or amniotic adhesions.

Mall believes that the evidence of monstrosities would be found more frequently in aborted ova, if more careful search were made. Signs of spina bifida and anencephalus are not infrequently encountered, and probably would result in monsters if the fetuses survived. This observer questions therefore, the wisdom of attempting to prevent a threatened abortion before placentation of the ovum is complete.

Renther and Pigeaud studied 100 ova, which were expelled intact, between the second and fifth months. In 30 of these, hemorrhage in the membranes, decidual endometritis, abnormal insertion of the placenta,

oligohydramnios, anomalies of the cord, meningeal hemorrhages and malformations were found, conditions wholly incompatible with continuity of fetal development.

**FAULTY EXTERNAL ENVIRONMENT versus INHERENT OVULAR DEFECTS**—Environmental and inherited factors in the etiology of abortion have each received emphasis by various observers.

(a) *Environmental Factors*—Mall is of the opinion that the formation of abnormal ova is due to faulty external environmental influences rather than the result of inherent pathological defects in the ovum or spermatozoon. To substantiate this theory he cites the conditions encountered in ectopic gestation. Here the external normal surrounding of decidua is absent or defective with the result that 96 per cent of the embryos are abnormally constituted.

Whitehouse (*loc cit*), at the recent discussion of this subject before the Royal Society of Medicine in London, directed attention to the site of implantation of the zygote and the conditions of its subsequent nutrition as all important factors in abortion.

Implantation in the decidua of the lower uterine segment is, he believes, usually followed by death. Every type of abnormal embryo and monster known to occur in the human, can, he claims, be produced in other species from normal ova, by artificial interference with environment.

In the light of recently acquired knowledge of the hormonal influences in pregnancy, an unexplored sphere of external influences operating to produce abortion is thrown open for consideration.

Sensitization of the uterine endo-

metrium by the hormone of the corpus luteum is essential for the normal implantation and development of the ovum. If either the endometrium or the hormone affecting it are of poor quality subsequent abortion may occur.

Thus it is evident that if the endometrium is atrophic or its decidua poorly developed, as is often discovered in curetting after an abortion, it will respond to the hormone of the corpus luteum in a defective manner with subsequent abortion. Such a defective endometrium may be due to the influence of fibroids or infection leading to a decidual endometritis. Endometritis also predisposes to hemorrhage. This may either kill the ovum directly or render the uterus intolerant so that the ovum fails to secure a nidus favorable to development.

With regard to the influence of the hormone of the corpus luteum itself, Whitehouse (*loc cit*) points out that Graafian and lutein hematomata and so-called theca-lutein cysts are frequently found associated with uterine fibroids and retroversion. As a result of these pathological lesions, the hormone elaborated by the Graafian follicle and corpus luteum, may be inadequate or destroyed, with subsequent decidual necrosis and abortion. Whitehouse reports that in 300 women who gave a clinical history of three or more abortions, uterine lesions were present in 53.3 per cent. Evidence of chronic inflammation of the pelvis was noted in 26.6 per cent.

Recent experiments upon rats and mice are of interest in this connection. It has been demonstrated that the artificial production of an estrus

phase in these animals during pregnancy will result in abortion.

Smith has shown that pregnancy in the rat could be interrupted in its early stage by the injection of the estrus producing hormone or female sex-hormone. Parkes and Bellerby found that pregnancy in the mouse could be terminated at any stage by the administration of an adequate dose of this substance. B. Zondek and S. Aschheim (*Endokrinologie* 10 (Jan.) 1928) in like manner produced abortion in the mouse by using 10 mouse unit doses.

The effects of the injection may be manifested in 1 or 2 ways: (1) In the early stage of pregnancy the effort of the uterus to assume an estrus state as a result of the injection may prevent the embryo from becoming firmly implanted, (2) the injection may destroy the function of the persistent corpus luteum and bring about a situation analogous to that produced by the removal of the corpora lutea during pregnancy.

Abortion has also been reported by E. T. Engle and C. Mermod (*Am J Physiol* 85:518 (July) 1928) as a result of the artificial production of estrus during pregnancy by the injection of the hormone of the anterior pituitary body.

The question arises, therefore, whether some form of an ovarian growth or hyperfunction of the pituitary gland may not produce an abortion in an analogous manner by over-stimulating the formation of female sex-hormone.

(b) *Inherited Factors*—A. Robinson (*Proc Roy Soc Med (Sect Obst and Gynec, and Sect on Comparative Med)* 33:1 (Dec.) 1929) assumes an opposing viewpoint. He

contends that inherent pathological attributes in the germ cells themselves, or incompatibility of the ovum and spermatozoon, may be responsible for the production of abnormal embryos and consequent abortion

In support of this view, he mentions the results of a painstaking research on the fate of 1643 ova shed from the ovaries of 165 ferrets. More than 30 per cent of these failed to produce living offspring. Some of the shed ova had not been fertilized although plenty of spermatozoa were present. Robinson assumes that in these cases the ova and spermatozoa were for some reason incompatible. Although most of the ova had been fertilized, about 40 per cent of the zygotes had failed to give rise to living young. Since multiple young are produced in these animals and since the dead zygotes are found in the same uterus with living embryos that normally will proceed to term, Robinson argues that the inherent constitution of the dead zygote must be at fault because its environment is not different from that of the living embryos.

Defective vitality of the germ cells may explain why certain women abort 1 or more times, if and when pregnancy does occur. Of a group of 336 childless women cited by Whitehouse, 71 aborted.

J L Huntington (Am J Obst and Gynec 17 32 (Jan) 1929), from a study of 104 cases, believes that defective germ cells is a prominent cause of abortion. While this impairment may exist normally and account for an occasional abortion in healthy persons with unimpaired fertility, it is more likely to arise in overnourished or undernourished women. It

may result also from focal infection or faulty endocrine balance involving especially the thyroid gland. Further the spermatozoon may be able to impregnate the ovum, but lack the vitality to bring the egg to full development.

Weak spermatozoa may contribute an impulse inadequate for the growth of the ovum. In this connection it is interesting to note the recent experimental work of Jarcho with female rabbits, demonstrating the ability to destroy their fertility by the intramuscular injection of spermatozoa. In a similar manner excessive coitus, it is believed, may kill the fetus by virtue of absorption of a large quantity of spermatoxins, although it is equally conceivable that corpus luteum formation may also be hindered by the frequent bursting of the Graafian follicles and by the intense vascular disturbance incident to sexual excitation. It is said that abortion is frequent in cows covered by a sexually exhausted bull.

Sperms have been shown by G L Moench (Am J Obst and Gynec 13 334 (Mar) 1927) to possess variations in morphology and motility which may have an important bearing on their ability to fertilize. To assume that similar changes may arise in the ovum itself, does not appear unwarranted.

From the foregoing it is evident that both these views of environmental and of inherited influences deserve consideration. Viewed from the clinical standpoint, it is perhaps less important to determine the relative frequency of these defects than it is to bear in mind that either faulty environment or inherent pathological defects may be the cause of abortion.

**MALNUTRITION OF THE OVUM**—Whitehouse (*loc cit.*) discusses the influence of impaired nutrition of the ovum as a possible factor in abortion. The ovum depends for nutrition upon absorption from the maternal blood, except for the initial period when the syncytium is actively burrowing and embedding itself in the decidua. At this stage, some of the uterine glands are penetrated by the trophoblast and absorption of the secretion of the glands, normally rich in calcium and iodine follows. In pregnancy there is a marked retention of secretion in these large dilated glands with probably some diffusion of secretion between them and the decidua.

Experiments at the Staffordshire Farm Institute have shown that sows receiving iodine farrowed 50 per cent more young, than those that received no iodine. The iodine content of the uterine secretion in the human female may have a similar significance. This possibly may explain the efficacy of iodine in repeated abortions as used empirically by older writers.

**TREATMENT**—A discussion of the therapy of abortion necessarily covers several different, although related subjects, each one requiring separate consideration. One phase involves the paramount value of prenatal care with respect to the prevention of abortion, another, embraces the more serious problem of frustrating a predisposition on the part of the patient to abort, still another includes the treatment of threatened, inevitable and incomplete abortion, and finally, there is the controversial subject of the management of febrile or septic abortion.

The therapy of a patient with a pre-

disposition to abort requires an exhaustive investigation of both the male and female similar to the methods adopted in the study of sterility. Attention must be directed to ascertain whether the physiology of the reproductive system is normal as well as to correct any pathologic conditions in either partner.

**FEBRILE ABORTION**—Unfortunately, there is no unanimity of opinion concerning the proper treatment of febrile abortion. Many conflicting views exist as to the advisability of instituting active as against expectant or conservative treatment. The conservative policy, however, is generally favored and practised. **Rest, fresh air, sunlight, nourishing food, tonics and blood transfusion** are looked upon as the best means at hand. **Drainage** is favored by **elevating the head of the bed**. Ovular remnants, if protruding, are gently removed. Intra-uterine manipulation is, whenever possible, avoided. **Curetage** is not advocated or practised because of the danger of breaking down nature's barriers and disseminating infection.

DeLee advocates a "*laissez faire*" policy. He does not invade the uterine cavity until the temperature is normal for at least 5 days, the leukocyte count is down to normal and the sedimentation rate of the red blood corpuscles is normal. In all cases of inevitable abortion, when delay in expulsion occurs, he administers **quinine 0.2 Gm (3 grains)** every hour for 5 doses, followed by **pituirin** hypodermically, 1 c c (16 minims) every 3 hours for 4 doses. If *bleeding* demands treatment during the febrile period, the **uterus is packed with gauze saturated with hexyl resorcinol**



solution or 4 per cent **mercurochrome** and the **vagina** with dry sterile **cotton**

E Novak (South M J 21 317 (Apr) 1928) is also of the opinion that febrile abortion should be treated expectantly. When abortion has been induced, operative procedure should be avoided, especially in the presence of grave sepsis, which is usually streptococcal. Instrumental evacuation of the uterus is contraindicated in the presence of complications such as broad ligament cellulitis or pelvic abscess.

G Gellhorn (*loc cit*) discredits the use of serums or vaccines or the intravenous injection of **mercurochrome**. He favors **protein therapy** by which the natural resisting power is raised, in the form of intramuscular injections of **milk** or repeated **blood transfusions**. If there is a spread of the infection outside the uterus, strict conservatism is observed. **Iodoform gauze packing** in the **vagina** is employed if severe *bleeding* occurs.

If re-examination on the third day does not reveal any complication or tenderness outside the uterus, **curettage** is performed irrespective of fever. After evacuation, the uterus is kept contracted by the administration of **ergot**, and **milk injections** are continued until the fever disappears.

Schotmuller insists on a thorough bacteriological study before attempting any form of treatment. He cites 3200 infected abortions treated by **curettage**, with a mortality rate of 0.3 per cent. He points out, however, that only in the most experienced hands is the curette a satisfactory implement. He awaits spontaneous opening of the cervix, first, so that a fairly large curette can be used.

Holden reports 4072 abortions treated in the Bellevue Hospital between 1920 and 1927. The conservative plan was followed in all.

Adair, of Minneapolis, maintains that it is extremely dangerous to enter the uterus a second time, as most of the fatal cases of sepsis following abortion which he has seen, have been those in which the uterus was entered more than once.

From the foregoing, it is clear that the number of obstetricians who prefer conservative non-operative measures is gradually increasing. Finally the paramount importance of antenatal prophylaxis, must in the final analysis, be again considered as the most effective therapeutic weapon at hand.

### ACANTHOSIS NIGRICANS.

—**DIAGNOSIS**—This rare disease occurring in both adults and juveniles is characterized by 2 cardinal symptoms, roughening of the skin with papillary hypertrophy and pigmentation.

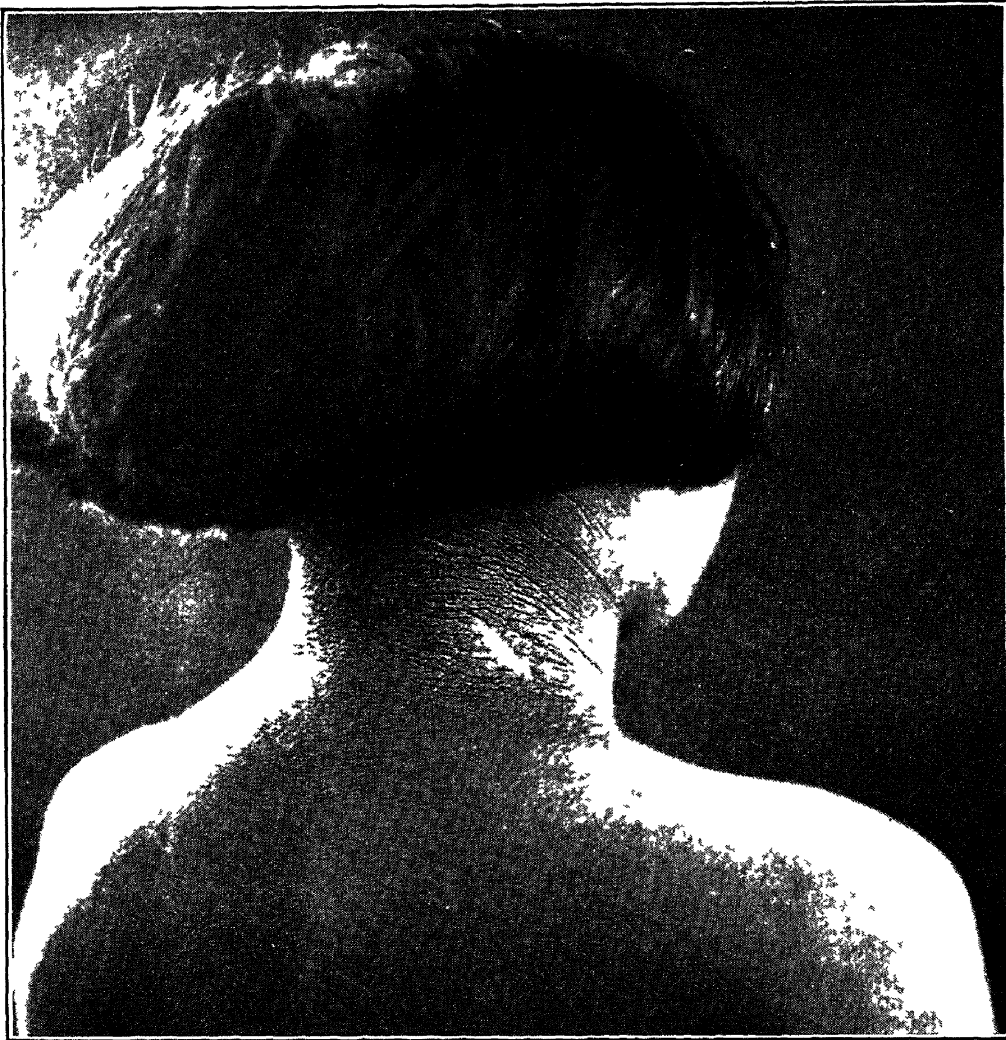
The lesions occur symmetrically and affect the back of the neck, axillæ, peri-anal and genito-crural regions most commonly, but the umbilical region, flexor surface of elbows and knees, the breasts, and hands and feet are involved to a greater or less extent.

The buccal mucosa does not show any pigmentary change, however, warty excrescences may be present.

The disease occurs in adults and juveniles, and in the former it is often associated with malignancy. Mook and Drews (J Missouri M A 26 510 (Oct) 1929) have found in 43 adult cases of acanthosis nigricans the undoubted presence of carcinoma.

In addition they found 22 cases in which new growths were probably present but not definitely proven. In the list of the positive cases one finds the following distribution carcinoma

the pigmentation is not nearly so marked—the scalp is commonly affected and the lesions show the presence of pseudo-psorosperms. The papillary hypertrophy present in



Acanthosis Nigricans, Juvenile Type

of the stomach, 28, carcinoma of the uterus, 4, carcinoma of the rectum, 2, carcinoma of the breast, 3, carcinoma of the gall-bladder, 1, carcinoma of the lung, 1, sarcoma of the colon, 1, chorioepithelioma, 1, lymphosarcoma, 1, melanoma, 1.

The affection which most closely resembles acanthosis nigricans is Darier's disease. In Darier's disease

acanthosis nigricans distinguishes it from Addison's disease.

The type occurring in children is usually benign and has no bearing on the general health.

**ETIOLOGY.**—Swartz and Miller (Arch Dermat and Syph 18 534 (Oct) 1928) endorse the mechanico-nervous theory of Darier, "that intra-abdominal pressure from primary

or metastatic neoplasm implicating the nervous structures of the sympathetic system and causing an interference with their normal function play an important part in the causa-

thosis nigricans is dependent on malignancy is probably not warranted, however the presence of malignancy can not be regarded as purely accidental



Acanthosis Nigricans, Juvenile Type

tion of the integumentary changes peculiar to the adult type of acanthosis nigricans "

M Artom (*Giorn ital di dermat e sifil* 69 184 (Apr) 1928) concludes that, "developmental abnormalities are the etiological factors and the coexistence of carcinoma is dependent on the same constitutional factor" That the adult type of acan-

There are many who wish to believe that acanthosis nigricans must be symptomatic of suprarenal pathology, however no cases of Addison's disease with acanthosis nigricans have ever been reported and the relationship, if any, between adrenal disease and acanthosis nigricans has not been proven

In the case of the juvenile type of

acanthosis nigricans reported by Knowles, Sidlick and Ludy (Arch Dermat and Syph 19 391 (Mar) 1929), certain clinical findings indicate that tuberculosis may be causative

Pardo Costello (Rev med cubana (Nov 30) 1929) presents a case of juvenile type of acanthosis nigricans occurring in a man of 23 who had symptoms since he was 3 years old. Clinical findings in this case led the author to believe that the disease was of sympathetic and endocrine nature

**TREATMENT**—In the adult type of the disease where malignancy coexists no remedy is of avail. Mulzer reports a case in which the cutaneous symptoms disappeared following the removal of a growth. Glandular therapy, especially suprarenal cortex and thyroid extract, is indicated

**ACROMEGALY—ETIOLOGY**  
—In an editorial (J A M A 93 849 (Sept 14) 1929), the use of the canine species in the experimental study of acromegaly has been justified by the observation of marked increase in weight and other characteristic changes in size and behavior induced by the injection of active extract of the anterior lobe of the pituitary of the ox. Although the association of the hypophysis with acromegaly is not new, the ability to produce the disease at will experimentally has made it much easier to interpret the underlying changes that induce such remarkable alterations in the physique

H M Teel and O Watkins (Am J Physiol 89 662 (Aug) 1929) have discovered a marked drop in the non-protein nitrogen of the circulating blood of dogs during a course of in-

jections of active pituitary extract. Thus it is firmly believed that the growth-producing principle of the anterior hypophysis has an immediate effect on the non-protein nitrogenous constituents that reach the blood stream. The Harvard investigators believe it reasonable to assume that this is a process of mobilization from the blood for the purpose of building up new protoplasm.

**PATHOLOGY.**—P Carnot, A Lambling and M Tissier (Bull et mém de la Soc méd d hôp de Paris 53 505 (May 6) 1929) report a necropsy on a woman 76 years of age, with acromegaly, who died of cardiac decompensation. A tumor of the hypophysis was not found, but instead, a partially calcified psammoma, taking origin in the meninges in the region of the falx cerebri and compressing the left frontal lobe. No changes in the sella turcica or in the clinoid processes were observed roentgenologically, clinically or at necropsy. The patient never suffered any symptom of cerebral compression, except for a mild cephalalgia several years before

**DIAGNOSIS**—Edward S Mills (Canad M A J 18 278 (Mar) 1928) reports a case of acromegaly in a French-Canadian aged 53 years. He presented himself with the complaint of pains in the loins, back and legs, sweating and shortness of breath. At the time of examination he weighed 249 pounds. The time of onset of the present illness was indefinite, but about 55 years ago he began to suffer from aching pains, in the legs, back and groins. Soon he was forced to use a cane in walking. He noted increasing difficulty in biting because of an overdevelopment of the lower jaw

Physical examination revealed a man with a rather large sized head for the remainder of his body, the face being oval, due to the prominence of the lower jaw. There was no unusual spacing of the teeth. The hands appeared large, due to the width of the palm and the short stubby fingers. His gait was that of the rolling type of a seaman.

The thorax was huge and deep and the abdomen was large and pendulous. The liver extended 2 fingers' breadth below the costal margin. The routine laboratory examination was negative, except for the basal metabolic rate, which was plus 28, and the glucose tolerance test, in which the blood sugar arose to 196 per cent, and glycosuria was noted at the end of the second hour.

The x-ray showed a marked development of the frontal and occipital areas, with a thickening of the tables, and a very large pituitary fossa. No erosion of the clinoid process was seen. Hypertrophic changes were also in evidence in the vertebræ. The fields of vision and the fundi were reported negative.

The author believed that in this instance, as in many others, the cause of the acromegaly was probably a chromophile adenoma of the anterior lobe of the pituitary gland. The chromophobe adenoma, in contradistinction, do not elaborate the growth stimulating secretion, and consequently do not lead to acromegaly. They produce signs and symptoms of local pressure, notably headache and blindness of the bitemporal type. The cases possessing chromophile adenoma rarely seek advice for any symptoms of local pressure, and long before the tumor has developed to a

sufficient size to cause blindness, there is a stimulation in growth, resulting in the acromegalic syndrome. If the onset is before the development of ossification of the epiphyses, gigantism is the result, if afterwards, the more perverted type of growth occurs.

**TREATMENT**—The results of treatment of this condition are far from satisfactory. Deep radiation of the hypophysis has been tried, but has not yielded results of any serious consequence. It is now employed only as a preoperative measure. Partial destruction by operation is attended by considerable success but is not permanent. The entire lobe cannot be removed, therefore, a cure is not to be entirely expected. Cushing has reported 291 operations, approaching the gland by the trans-sphenoidal route in 253 instances. The direct operative mortality in either method is in the neighborhood of 5 per cent. The immediate result in those cases which survive the operation is surprising. There is a rapid diminution in both weight and size and the basal metabolic rate is reduced to normal. There is a greater tolerance toward sugar and the menstrual cycle is redeveloped, while fertility is restored. This period of improved health may continue for from 5 to 15 years, after which, there is a gradual return of the symptoms. A most prominent contraindication for operation is a myocardial degeneration, and in these instances it should be advised only in the presence of a definite opportunity to alleviate the signs of local pressure.

**ACTINOMYCOSIS.—ETIOLOGY**  
—Actinomycosis is due to *actinomyces bovis*, first described by Israel and

Wolff in 1878 Bostroem, in 1890, isolated a streptothrix from human cases of actinomycosis apparently identical with an organism found widespread in nature on grasses and greens While this streptothrix has been widely confused with *actinomyces bovis*, Wright, contrary to the general opinion, contends that they are quite different organisms The *actinomyces bovis* may exist as a saprophyte in the normal mouth and intestinal tract, as Lord, in 1910, isolated the organisms from carious teeth and the cryptic tonsils of healthy patients The disease is most common in the Northwestern and Middle Western States, but occurs everywhere in the United States Eighty per cent of the patients are male and 20 per cent female The disease occurs usually between the ages of 20 and 30, although it may appear in any age of life In 60 per cent of the cases, the face and neck are affected, in 80 per cent the abdominal wall and viscera, starting at about cecum and appendix, and from there spreading to the liver, while 14 per cent show involvement of the thorax Primary involvement of the skin is unusual

From a study of actinomycosis in Europe, B Galli-Valerio and L Ribordy (Schweiz med Wchnschr 59 131 (Feb 9) 1929) found the following proportion Cervico-facial 60 per cent, pleuro-pulmonary 13 per cent, abdominal 15.7 per cent, parietal 4.5 per cent, cutaneous and of the extremities 2.2 per cent, cerebral 3.9 per cent Cutaneous actinomycosis is rare in Europe and is the most frequently observed in hot countries, where the skin is less protected by clothes The organism is very resistant to freezing, sunshine and dry-

ing and may remain alive for as long as 5 years

The possibility of experimental inoculation of the actinomycosis is proved by B Baroni (Arch ital di chir 21 529, 1928), who inoculated 89 animals, including white rats, gray rats, guinea-pigs, rabbits and cats From injection into the jugular vein and heart, generalized forms of actinomycosis localized particularly in the lungs, myocardium, the male genitals, liver and frequently the brain occurred A subacute or chronic form followed inoculation of the peritoneum, with a tendency to heal in the rabbits and guinea-pig, and to extend in the rats and cats In abscess produced by inoculation in the testicle, the micro-organisms could rarely be found and then only in the form of filaments Subcutaneous inoculations produce circumscribed abscesses which sometimes open and heal spontaneously Epidermal inoculation was negative Cultures from the older nodules were at times negative

The extraction of teeth was followed by the onset of actinomycosis in 6 cases reported by A V Desjardins (Radiology 11 321 (Oct) 1928) There is much evidence that the disease occurs as a form of dental caries from picking the teeth with straws or chewing bits of straw or grass

Actinomycosis should be suspected in all children with abscess of the lung, who have been playing on the ground in the country In a man of 40 years, who pricked his finger while loading hay, for 2 years actinomycotic lesions spread over the hand After 3 months of treatment with potassium iodide he was able to return to his work and later recovered completely except for a stiff finger

Actinomycosis may be a late result of war injuries from the soldier having bedded in straw. In 2 cases reported by O Boyksen (Zentralbl f Chir 55. 1542 (June 23) 1928), there had been wounds of the abdomen and pelvis respectively. One of the patients died of the actinomycosis which affected the entire ileum.

**SYMPTOMS**—In the oral type, a localized swelling develops which in a few weeks discharges a yellowish green pus, containing grayish or yellowish particles or "sulphur granules". Pointing usually occurs somewhere upon the skin. Sooner or later, a secondary abscess contiguous with original lesion forms and in a few months a row of abscesses are present which follow the general direction of the jaw. The lips are not involved except from secondary infection, and metastasis to the lymphatics is rare but occasionally occurs through the blood stream to the lungs or liver. The lesion shows central necrosis, the surrounding zone a leukocytosis and an outer wall of connective tissue which is, however, ineffectual in preventing the spread of the disease. The disease usually continues for from 1 to 3 years, or it may clear up in a few weeks or last as long as 15 years.

**PROGNOSIS**—In the cervico-facial form, prognosis is fairly good, in the abdominal form it is grave and in the lungs very grave.

**TREATMENT**—Although Harbitz and Giordale have shown that potassium iodide up to 2 per cent in culture media fails to inhibit the growth of actinomyces, the administration of iodide is often of great benefit to the patient. In one of 2 cases reported by N Epstein and P Schoenholz

(California and West Med. 30:395 (June) 1929), while the condition did not respond to potassium iodide by mouth or x-ray therapy combined with surgical drainage of the abscesses, when the iodide was given intravenously the signs of iodism disappeared and the condition improved. Following non-specific protein therapy with typhoid, paratyphoid, alpha and beta vaccine intravenously, the condition quickly responded with the complete disappearance of all evidence of disease and there has been no recurrence. These authors prescribe potassium iodide to the point of tolerance, surgical drainage of the abscesses, small doses of x-ray irradiation and the use of non-specific protein therapy as the most effective therapeutic measures. Methylene blue, copper salts, radium and arsphenamine have been advocated and cases have been reported in which vaccine therapy using a specific vaccine of killed actinomyces fragments has seemed of definite value.

J B Christopherson (Proc Roy Soc Med 21 471, 1928) believes that large doses of potassium iodide over long periods of time may be necessary to obtain a cure in actinomycosis. He has given 240 grains (16 Gm) daily for over 5 months without causing any ill effects and reports a case of actinomycosis of the *parotid gland*, under treatment for more than 2 years, for which radium and x-ray irradiation failed to cause improvement.

In 2 cases of actinomycosis, Cornioley and Fischer (Bull et mém Soc nat de chir 54 335 (Mar 10) 1928), after 2 intravenous injections of serum irradiated by 15 to 17 millicuries of radium, observed rapid heal-

ing of the actinomycotic lesion. In each case, the disease was of long duration and potassium iodide had not been used.

Five minims (0.3 c.c.) of tincture of iodine and milk, given 3 times daily, was followed by cure in 4 cases of actinomycosis treated by H. Chitty (Brit. M. J. 1:347 (Feb. 23) 1929). Chitty also cites 2 cases of actinomycosis of the lungs, reported by Preston, in which marked improvement resulted after the intra-tracheal injection of iodol for diagnostic purposes, and a cure was effected later with iodine and milk.

Bronchoscopy and the injections of 40 per cent iodized oil were used in a case reported by F. E. Johnson and J. D. Kernan (Am. J. Dis. Child. 36:508 (Sept. 20) 1928) in a child of 3 years. Treatment should be supplemented by large doses of potassium iodide by mouth.

Twenty-two cases of actinomycosis are reported by T. Eiken (Ugeskr. f. Laeger 91:581 (July 11) 1929). Eighteen were of the head, neck and cervical region, in 2 the tongue was affected, one fatal case of cervicopulmonary actinomycosis developed from an actinomycosis of the throat, and 1 from a *actinomycotic appendicitis*. In half of the cases the onset was acute or subacute. Diagnosis can only be made certainly by demonstrating the actinomyces mycelium. Twelve patients, including 1 with abdominal actinomycosis, are believed to be definitely cured after observation from 1 to several years, 5 with apparent recovery have not yet been observed for a full year, and 4 are still under treatment, noticeably improved. The x-ray irradiation, consists of a scant half Holzkecht ery-

thema dose, with a filter of 5 mm. of aluminum, given about 6 times during the course of 9 months.

About 30 cases of *intra-abdominal* and *intra-thoracic* actinomycosis have been observed at the Mayo Clinic from 1920 to 1925. The earlier and more superficial the lesions, the more rapidly the x-rays caused them to undergo involution and disappear. When involving the head and neck, the disease can nearly always be eradicated by thorough irradiation, drainage of purulent collection, and the internal use of increasing daily doses of sodium or potassium iodide. DeJardins considers irradiation as the chief factor in the cure. When, however, the disease attacks the intestines or lungs, it often becomes extensive before its true character is recognized, and in such cases the irradiation is seldom effective in producing a cure, but slight or great improvement is not uncommon.

**HEAD AND NECK**—With the exception of the face, the most frequent site of actinomycosis is the upper half of the neck, the 2 regions are often attacked simultaneously. Actinomycosis of the mediastinum is always secondary. When the mediastinal dome has been invaded, the infection, if it persists, lifts the subaponeurotic cellular sheaths of the greater and lesser pectoral muscles, and may extend to form a vast abscess in the axillary region. The treatment consists in opening the foci by excision and the mechanical removal of tissue masses by sharp curette or scissors followed by tamponment of the cavities and fistulae by iodoform gauze. Superficial foci may be cured by potassium iodide alone, which does not destroy the fungus.



but acts rather on the neoplastic tissue, causing the latter to break down and thereby to quickly establish drainage. In some cases, **pneumectomy** has given good results.

Actinomycosis of the *submaxillary* and *salivary glands* may be diagnosed as a tumor, as in a case reported by H Ganner (Arch f klin Chir 155 495 (June) 1929) who emphasizes the importance of examining biopsy specimen very carefully for actinomycotic foci which may be easily overlooked. He feels that every chronic and inflammatory tumor of the salivary glands should be considered to be actinomycotic unless otherwise proved.

An involvement of the *antrum*, in a girl aged 12 years, is reported by H Feit (Arch Dermat and Syph 17 791 (June) 1928). The symptoms developed after the extraction of a loose tooth and involved the cheek but, according to the x-rays, did not involve the antrum. Resolution followed the use of large doses of **sodium iodide** and exposure to the **x-rays**. In a second patient, a man of 27 years, abscesses followed by actinomycotic infiltration occurred on the jaw with final pneumonia and exitus.

**LUNGS**—Pulmonary actinomycosis occurring in a negro girl, 2½ years old, who was born and reared in Chicago, is described by L J Halpern and A Levinson (J A M A 91 13 (July 7) 1928). There was an extensive involvement of the right lung, the formation of a cold abscess over the right pectoral region, and perforation of the chest wall. The second, third and fourth ribs anteriorly were eroded. The clinical diagnosis was tuberculosis but the microscopic section showed typical actinomycosis

with secondary bronchopneumonia. In a case of actinomycosis of the right lung and posterior thoracic walls described by R M Brickner and A P Zemansky, Jr (Arch Neurol and Psychiat 19 515 (Mar.) 1928), there was evidence of sympathetic irritation involving the right side of the face, neck, the upper right extremity and the right side of the chest down to the twelfth rib. Hyperidrosis, goose-flesh, pilo-erection, unilateral nipple erection and exaggerated response to the drawing of pin across the skin, lowering of temperature and pallor of the right hand, as compared with the left, and bizarre responses of the upper right extremity, as well as extensive changes in temperature were noted. No change of blood-pressure, growth or condition of the nails or hair, or the reactivity of muscles or nerves to electrical stimulation or to epinephrine was observed.

**LIVER**—In a woman of 34 years, who gave a history of attacks of epigastric pain over a period of 2½ years, with belching, flatulence and finally deep jaundice and a loss of 65 pounds in weight, W S Fulton and W M Sheppe (Virginia M Monthly 55 443 (Oct) 1928) found an isolated actinomycosis of the liver. There was an indefinite mass in the epigastrium with enlargement of the liver, secondary anemia and a leukocytosis of 13,800 and a solid grayish yellow mass about the size of an orange. The patient recovered after **operation** followed by **potassium iodide** and **x-ray** therapy. There was a history of the tonsils having been swollen for 3 weeks following the extraction of a tooth and it is believed that infection entered the gastro-intestinal

tract and reached the liver by way of the portal vein

**INTESTINE**—Actinomycotic ulceration of the *duodenum* and *jejunum* in a man of 40 years, who had been suffering for 4 months from vague abdominal pain, loss of weight and appetite and gastric stasis, is reported by W I de C Wheeler (Brit J Surg 15: 430 (Jan) 1928) There was a severe attack of hematemesis and achlorhydria, with a dilated, hypotonic stomach At operation a tumor-like mass was found in a loop of jejunum about 1 foot from the duodeno-jejunal flexure At 2 or 3 places, perforations, closed by loose adhesions, were found A resection and an end-to-end anastomosis was done On the eighth day the patient died, apparently of leakage from perforation along the line of anastomosis The lymph nodes did not contain the streptothrix

**BONE**—Actinomycosis, producing abscess in the upper part of the diaphysis of the tibia, in a woman aged 29 years, is reported by A Krogus (Acta chir Scandinav 63 121 (Mar 7) 1928) The patient, 4 months after an injury to the knee, noticed a tender swelling in the upper part of the left tibia, with serous exudation in the joint and marked pyrexia The abscess, on being opened, was found to contain an extensive yellow green pus and a secondary abscess developed in the lower part of the thigh containing actinomycotic granules No primary actinomycotic focus could be found in the lungs or other organs Despite iodine medication, x-rays, sunlight and other treatment, the patient died about 8 months after admission to the hospital Evidently there was an hematogenous actinomycosis of the leg, although the primary

focus could not be detected Five similar cases have been described in the literature, in 1 of which no primary focus could be found

#### **CENTRAL NERVOUS SYSTEM.**

—Actinomycosis in the *brain* of a youth of 19 years is reported by B C Ledeboer (Nederl Tijdschr v Geneesk 1 122 (Mar 10) 1928) The patient had first a ptosis of the right lid, followed by total ophthalmoplegia on the right side, then left abducens paresis and swelling of the right half of the face, high fever, emaciation, large increase of cells in the cerebrospinal fluid, Kernig's sign, slight delirium and, at the end, pathologic foot reflexes These apparently started in the oculomotor nerve and the patient died in about 12 weeks with numerous pea-sized abscesses in the right temporal lobe and 1 abscess 3 or 4 cm in diameter The parasite was found in the pus but not in the cerebrospinal fluid, and the pus presented no macroscopic peculiarities Actinomycosis of the central nervous system is often missed Ponick first described 2 cases in 1882 Borsch, in 1922, collected 48 cases from the literature and showed that the disease was more frequent in men than in women, the age of the patients ranging from 15 to 70, the highest incidence being at about 50 It occurs most frequently in farmers and others who come in contact with grain In most of the cases the central nervous system is affected by the spread of the disease from other parts of the body, a primary involvement of the brain being rare The most frequent form is meningitis In Ledeboer's case the disease was primary in the nervous system, since nothing abnormal was found in the other organs of the body

**GENITO-URINARY SYSTEM.—**

A case resembling bilateral renal tuberculosis is described by P Berego (J Michigan M Soc. 28 383 (May) 1929), in which the diagnosis was made by finding the organism in the urine at a time when the patient did not present symptoms warranting a diagnosis of infection. At autopsy, both kidneys contained many foci, and nodules were palpable in the lungs. In the case of F Rupp (Deutsche Ztschr f Chir 211 208 (Aug) 1928), the bladder was involved, with the formation of a tumor appearing not unlike a malignant growth. The original seat was in the large bowel. The patient had protracted diarrhea, followed by the development of a tumor in the vesical region. Under the administration of potassium iodide, diathermy and sunlight, complete resolution occurred.

A case of actinomycosis of the genital organs and pelvis following an instrumental criminal abortion is reported by G Haselhorst (Arch f Gynak 134 561 (Aug 28) 1928). The condition was diagnosed as parametritis, but puncture through the vagina yielded pus containing actinomyces. The entire presacral and parasacral connective tissue and the lateral pelvic wall were involved. The process had also extended to the intervertebral discs between the third, fourth and fifth sacral vertebrae, and to the os sacrum, the ischiatic foramen and around the left hip joint. It is believed that infection took place through a perforation of the uterus.

**SKIN**—A case of primary actinomycosis of the skin is reported by F Ronchese (Arch Dermat and Syph 20.1 (July) 1929). The condition limited strictly to the skin was

located on the dorsal inferior and medial regions of the left ankle, and had been present for 10 years, or since the patient was 9 years old. In part, it had been spontaneously cured. As x-ray irradiation and iodine did not improve the condition, total surgical removal of the diseased area of the skin was made with a permanent cure.

**ADDISON'S DISEASE.—ETIOLOGY.**—The causative factors in the development of this syndrome are little known. Animals whose adrenals have been removed will die following the development of hypotension and asthenia. Again, the cause of the pigmentation is unknown. Some have believed the high sulphur content of the blood was an important factor in the development of the melanoderms. Bittorf thought the bronzing of the skin was due to the increased amount of oxidase in the skin.

By far the most common observation at the autopsy table in cases of Addison's disease is tuberculosis of the suprarenals. Seldom ever is it possible to find tumors, pressure on the suprarenal veins, lymphadenoma, syphilis or mycosis fungoides.

Addison himself first believed that anemia was a constant feature but many observers, including Sir William Osler, have had different experiences. Other than disclosing a hypo-epinephrinemia, blood studies have been of little avail.

D G Ghrist and L G Rowntree (Endocrinology 11 589 (Nov-Dec) 1927) report a case of Addison's disease resulting from tuberculosis of the suprarenals. The clinical picture was of the text-book type, with the

exception of the hyperpigmentation, which was lacking. The patient derived no benefit from epinephrine or adrenal cortex, but the case was confirmed, clinically and pathologically, at the Mayo Clinic and was the first of its type which has been so described at this clinic.

**PATHOLOGY**—William H. Higgins (J A M A 91 86 (July 14) 1928) reports a case of this disease in a white woman, aged 50 years, who was placed upon the Muirhead treatment, but died within 5 days, showing no response to the epinephrine therapy. Several years previous to her last illness, she had been attended by numerous physicians and both a tuberculous involvement of the lungs and a cystic kidney were found but surgical interference was refused.

At the necropsy the left adrenal was found to be very much atrophied, while the right organ was very much larger than normal. Due to its proximity to the right kidney, which was grossly infected, the suprarenal gland was quite brittle and friable, as a result of its involvement by a caseous process. Among other findings, the microscope revealed an advanced tuberculous destruction of the right kidney, a tuberculous pulmonary fibrosis and a chronic tuberculous fibrosis of both suprarenals. Thus, from this case it may be deduced that the patient probably had some tuberculous involvement in her body since she was a very young child but was able to withstand the infection until the time when her suprarenals became involved.

W. Wadi (Klin Wchnschr 7 2107 (Oct 28) 1928) reports a typical case in which there was a pronounced

system, with hypoglycemia, accompanied by severe comatose attacks. The latter could be aborted by the prompt administration of glucose and thus the author concluded that they were hypoglycemic reactions. The sensitiveness of the patient to epinephrine was greatly decreased, which is rather characteristic. Epinephrine 0.2 Gm (3 grains)—10 times the usual dose—raised the blood-pressure only 15 mm of mercury in 2 minutes, and lowered the blood sugar.

O. Brenner (Quart J Med 22 121 (Oct) 1928) described 5 cases of Addison's disease in which there was pronounced destruction of the cortical tissue, but the medulla was left uninjured. In 1 of the 5 cases no suprarenal glands could be found. The suggestion has been made that the toxic degeneration of the glands is the result of their special affinity toward an unknown toxin. As the result of the primary injury to the cortical cells, the remaining one is believed to be overworked and, therefore, a secondary tissue degeneration takes place. In many instances it was definitely observed that there were accompanying lesions of many of the other endocrine glands, particularly the thyroid. In conclusion, the inference is made that the cortex is the important tissue which is at fault in the production of the symptoms of the disease and a complete destruction of the medulla, or the chromaffin system, will not result in the series of symptoms which lead to the diagnosis.

**DIAGNOSIS**—According to Bonilla (Ginepézca méd 13 43 (Feb) 1928) hypotension is the most important of all the circulatory symptoms. Digestive symptoms although found constantly are not of diagnostic value.

L S Evans (Am J M Sc 176. 499 (Oct) 1928) reports 3 cases of Addison's disease in negroes. Previous to this time only 1 case could be garnered from the Index Medicus.

I I Lemann (New Orleans M S J 78 814 (June) 1926) states that the pigment produced in the disease is not a metastatic process, but rather an increase in the normal pigment, as shown by the microscopic findings. For this reason, many observers have believed the adrenals to have a restraining influence upon pigmentation.

These 3 cases mentioned above were typical and there was not the slightest doubt as to the accuracy of the diagnosis. The author attempted, in conclusion, to show the difficulty of diagnosis in the negro on account of the natural pigmentation, but in each of his cases there was a very pronounced pigmentation, even almost a blackening of the tissue, especially of the palms of the hands. With this went the asthenia and the lowered blood-pressure. In conclusion, he believes the disease is probably more common in the negro race than is generally supposed.

**TREATMENT**—J M Rogoff and G N Stewart (J A M A 92 1569 (May 11) 1929) report the failure of experimental work assuming that the disease is the result of a lack of secretion and administering epinephrine. Their studies have led them to the conclusion that the disease results from an interference with the cortex, rather than the medulla, of the glands.

It has been experimentally proven that epinephrine secretion is not indispensable for life and good health, as it has been suppressed in many animals with no ill effect. **Epinephrine** is of

some benefit in the amelioration of the symptoms. The authors believe the cortical or interrenal tissue contains a hormone which they have designated as "*interrenalin*."

The sparsity of cases in humans, and the fact that Addison's disease in humans is usually associated with tuberculosis of the adrenal glands, makes difficult an evaluation of the substitution therapy of cortical extracts when there is a definite inflammatory process to deal with in addition to the suprarenal insufficiency.

In the experiments of the authors, **suprarenal extracts** obtained from the cortex were used intravenously, in animals, and by mouth, in enteric coated capsules to resist gastric digestion, in the human. When earlier diagnosis and more refinement of the extracted product is made possible through research, more gratifying results will be obtainable.

At present, any patient whose blood-pressure persistently remains below 100 mm, associated with a gastrointestinal disturbance, increasing fatigue or muscular weakness, with or without noticeable pigmentation of the skin or buccal mucous membrane, should arouse the suspicion of a suprarenal cortical insufficiency when there is no other possible explanation present. When *interrenalin* is of benefit in such a case, it is further evidence of the impaired function of the suprarenal cortex.

In both the suprarenalized animals and in patients with Addison's disease, there is a peculiar, but rather constant, aversion for foods rich in fats. Anorexia and gastric disturbance, including bilious vomiting, are quite common. The low blood-pressure, which was formerly interpreted

to mean an interference with the secretion of epinephrine, is more probably a manifestation of an intoxication that develops as a result of a deficient cortical function

Treatment with **interrenalin** has been gratifying in some instances and, although there is a possibility of spontaneous improvement, it is significant that when improvement is seen, it usually occurs about 2 to 4 weeks after the beginning of the treatment. As to the prognosis following such treatment, sufficient time has not elapsed for a correct evaluation of this method of therapy and the cases will require observation for a continued period of time

Erich Leschke (Med Klin 24 1268 (Aug 17) 1298) reports the case of a woman, aged 28 years, who, suffering from Addison's disease, was given large doses of **whole suprarenal gland** by mouth over a period of 4½ months. There was no demonstrable benefit and at this time it was possible to obtain the greater part of a normal **suprarenal gland** from a patient at operation. This gland was immediately **implanted** into the abdominal muscles of the girl suffering with Addison's disease and the results were extraordinary. The patient regained her appetite and her strength improved rapidly. Her blood-pressure arose from 85 mm to between 110 and 125 mm, the blood sugar rose to normal, and the hyperpigmentation of the skin improved rapidly. The menses reappeared and there was a pronounced development of the pubic and axillary hair. Soon after the transplantation of the gland was accomplished, it became impossible to obtain the fresh suprarenal glands but treatment was continued with an **extract**

of the **whole gland** and injections of **arsenic**. Ten months after the transplantation, the patient was still well and enjoying good health, without a return of any of the symptoms

The author suggests that in those cases which are definitely tuberculous in origin, a sufficient period of restored health may permit a cure of the inflammatory process and a restoration of the function in the remaining part of the gland. This is certainly a happy prospect of bringing about a permanent cure in a certain portion of the patients

**ADENOIDS.**—Too often is the presence of tonsillar lymphoid tissue made the all important consideration and not enough emphasis placed upon the rôle of adenoid vegetations in the causation of disease. S R Boyce (Wisconsin M J 28 312 (July) 1929) calls attention to the clinical importance of adenoids. He states that the majority of middle-ear infections, frequently extending to the mastoid and internal ear and sometimes causing chronic deafness or fatal intracranial complications, develop as the result of inflamed and hypertrophic adenoid tissue in the naso-pharynx. By obstructing the breathway and interfering with reception of air into the lungs, enlarged adenoid masses may actually reduce the opportunity for thorough aeration of the blood. This gives rise to early fatigue, congested head, sleepy eyes, aprosexia and may be a large factor in the production of severe neuroses, such as chorea and epilepsy. Adenoids may be the focus from which infections in other parts of the body arise, as is more frequently the case with the faucial tonsils. But be-

cause of their obscure situation the adenoids may escape scrutiny in this connection

The evils to which adenoids lead are called attention to by G C Cathcart (M Press 128 269 (Oct 2) 1929), who evidently is struck by the lack of consent on the part of parents to operation, either from ignorant prejudice or from supposed intellectual superiority, laying their helpless children open to the following sequelæ, by taking upon themselves the responsibility for refusing operation

1 Stunted growth

2 Aproxia, which is the name given by Guye to the inability to concentrate the attention

3 Mal-development of the jaws, with projecting, irregular and crowded teeth, making it difficult to clean them properly, thus causing early decay and pyorrhea, as every dentist will testify

4 High arched palate, and consequent deflection of the nasal septum in later life, so that while the difficulty in breathing caused by the adenoids at the back of the nose may disappear, the deflection of the septum, which affects the breathing in the nose itself, and which was originated by the adenoids, may not become serious or require operation till the patient reaches the age of 30 or 40 or more, by which time the parents may be dead

5 Deafness This may be one of the early symptoms of adenoids by direct pressure on the Eustachian tubes, on the other hand, they may disappear without apparently causing deafness, but may only leave a chronic catarrh of the post-nasal space, which sooner or later, perhaps not till the patient reaches the age of

puberty, or even up to 25, will produce, as surely as night follows day, chronic catarrh of the Eustachian tubes, and so chronic catarrhal deafness.

**ADRENALS.**—Experimental work has recently brought to light the fact that the adrenal cortex undoubtedly contains or elaborates a substance or substances accelerating the catabolic phase of metabolism This was first shown by F S Hammett (Abderhalden's Fortschr d Naturwissensch Forschung, new series, iv, 1928) who found that thymus autolysis is markedly enhanced by the addition of a trace of cortex The principle was extended to muscle by T P Sun (Endocrinology 13 549 (Nov-Dec) 1929) who obtained a like result with this tissue The principle has been utilized by Sokoloff (Trans Int. Congr Physiol, 1929), and by W B Coffey and J D Humber (J A M A 94 359 (Feb 1) 1930) in causing a lysis of transplanted tumors in rodents After many failures an extract has finally been made from the cortex by Hartman (Am J Physiol 86 353 (Sept) 1928) and also J M Rogoff and G N Stewart (Am J Physiol 84 649 (Apr) 1928) which prolongs life of suprarenalectomized animals Thus a grip hold has finally been made, on which can begin real study of the functions of this hitherto baffling structure The cortex is apparently a most sensitive organ It recedes or shrinks under various generalized conditions such as malnutrition, and especially in thyroid deficiency, as shown grossly by Hammett and morphologically by Sun As far as the medulla is concerned, not much new which is worthy of note has appeared during the last 2 years

C H Lawrence and A W Rowe (Endocrinology, 13.109 (Mar-Apr) 1929) have made extensive laboratory and clinical studies of disorders attributable to the adrenals. In their report they point out the paucity of exact information available in adrenal disease, and give new correlative data of significance. Chief among them is the finding that the weight averages of adrenal cases are below those recorded for other endocrine groups, that the lung capacities reflect the degree of asthenia incident to the progress of the disease, and that albuminuria occurs in 100 per cent of the patients studied by them. Glycosuria occurred in over 40 per cent. Urobilinogen is absent a phenomenon of importance in differential diagnosis. The phthalein test indicates a somewhat lowered kidney permeability. Total nitrogen elimination is low and the percentage of residual nitrogen is high. Blood non-protein nitrogen is high. Basal metabolism is lowered as is blood pressure. Alveolar carbon dioxide is a low normal. Accompanying these changes is a low galactose tolerance. The chief complaints were asthenia, pigmentation, and nervous instability. Sufferers from *Addison's disease* are highly emotional, irritable, and victims of apprehensions and needless worries. Perspective is lost on the affairs of life and annoying or disconcerting trifles assume the magnitude of major calamities. Poor appetite, flatulency and other evidences of impaired gastro-intestinal function are present. The majority of patients showed excessive susceptibility to respiratory functions. Several were subject to vertigo. Nocturia was noted in 50 per cent and intermittent

polyuria in 2 cases. Seventy-five per cent showed enlarged blind-spots in the eye, and 25 per cent had yellowish discs.

**SUPRARENALECTOMY.**—The results of suprarenalectomy alone or associated with thyroidectomy and sympathectomy or of sympathectomy alone (in 2 cases) are reported by G W Crile (Ann of Surg 88 470 (Sept) 1928). Twenty-nine cases, including 13 of epilepsy, 4 of neurasthenia, 3 of endarteritis obliterans, 5 of hypertension and 4 of hyperthyroidism with hypertension were thus treated. In endarteritis obliterans and hypertension the results were negligible and in neurasthenia they were inconclusive. In **epilepsy**, however, the results of the combined operations were encouraging. The early results of adrenalectomy for **hyperthyroidism** show marked improvement but the end results cannot yet be reported.

**TUMORS —ADENOMA** —Adenoma of the adrenal cortex is quite rare and is usually discovered only at autopsy. A considerable number of cases, however, produce a symptom syndrome designated *virilism*, which in women consists of a diminution of the primary and secondary sexual characteristics with a change toward the male type. All such adenomata discovered by clinical examination have occurred in women and children. They have been found in males only at autopsy. They may be mistaken for hypernephroma and probably often undergo malignant change.

The most common signs in females are the growth of a beard, the growth of hair on the chest and extremities, the male distribution of the pubic hair, a deepening voice, the cessation



of menstruation, etc In boys there is premature development of the external genital organs and in adult males impotence A rare sign is pigmentation of the skin A mass may be demonstrable by physical examination, pyelography or surgical exploration

The benefits of surgical removal of the tumor are great though the mortality is high In young persons early surgical intervention is advisable also, to prevent malignant changes in these benign tumors

J B Hicks (New England J Med 199 1140 (Dec 6) 1928) reports a woman of 48 years with a mass in the left upper quadrant of the abdomen It resembled an enlarged spleen but pyelograms suggested hypernephroma The patient complained of irregular menstruation, frequency of urination, dragging pain in the abdomen, yellowish-brown pigmentation of the skin and the development of a tumor Blood was found in the urine There were no symptoms of virilism The final diagnosis of adenoma was made only after pathological examination

In a renal tumor without metastasis exploration should be advised on the possibility that the tumor may be adenoma

A case of *virilism* in a woman aged 38, is described by A H Crosbie and L W Smith (J of Urol 19 241 (Mar) 1928) This patient was normal until 20 years of age at which time excessive hair appeared on the face and abdomen, her voice and figure approached the masculine type and her skin became coarse and dry At 29, a previously normal menstruation ceased She also complained of fever, chills, pyuria and pain in the left upper abdomen Physical and

cystoscopic examination showed a large mass filling the right abdomen and pushing the right kidney pelvis to the left of the midline At operation the mass was found to be an adrenal tumor and removed. Subsequently the patient began to lose the pseudohermaphroditic appearance and to assume more feminine characteristics Menstruation was re-established, the skin became normal and the right kidney pelvis returned to the right side of the abdomen

A case is reported by M Winkel (Deutsche Arch f klin Med 159 1 (Mar) 1928) of a woman aged 36, who in the course of 11 years developed *virilism* apparently due to an adenoma of the cortex The accompanying hypertonia, glycosuria, polycythemia and comparative increase in neutrophile leukocytes indicated hyperfunction of the medulla The blood sugar remained within normal limits and its constancy after the injection of insulin suggested the increased production of epinephrine A mass of the right suprarenal gland was demonstrable by palpation and x-ray The tumor was removed, but 2 days later the patient died At necropsy both suprarenal glands, both ovaries, and the thyroid showed atrophy, the pancreas and pituitary were normal

Amenorrhea, *virilism*, hypertension, albuminuria and glycosuria with considerable emaciation occurring in a young woman, aged 20, led L Langeron, E Decherf and A Danes (Bull et mém Soc méd d hôp de Paris 53 436 (Apr 1) 1929) to diagnose suprarenal tumor The tumor was localized radiologically, pneumoperitoneum being employed Death followed excision of the tumor by 36 hours No postmortem was done but

death was ascribed to cardiovascular reflexes caused by manipulation of the sympathetic nerves during operation, rather than suprarenal insufficiency

**HYPERNEPHROMA**—Benign types of hypernephroma are often present for many years without symptoms or recognition. A case of this sort is reported by C G Hoffman (Kentucky M J 27 287 (July) 1929). A male aged 66 complained of a dull, aching pain in his back and a tumor was discovered in the right loin. After appropriate study a diagnosis was made of hypernephroma of the right kidney, inoperable because of low kidney function and limited phthalein output. Two years later he returned because of profuse hemorrhage from the right kidney, a slight increase in the size of the tumor and emaciation. The kidney function was still quite low and the hemorrhage ceased following cystoscopy. He was given x-ray therapy and returned in 2 months. He had gained 22 pounds and had experienced no further urinary symptoms, though the mass was not appreciably reduced. The patient refused operation.

A case is reported by Mann (Am J Obst Gynec 14 838 (Dec) 1927) of hypernephroma of the left kidney in a woman aged 42. The onset 1 year before was with pain in the entire upper abdomen becoming so severe as to incapacitate her in 4 months. She had lost weight and strength. There was slight jaundice, enlarged liver, and a mass in the left upper abdomen. The temperature persisted at 102° F (38.9° C). Routine tests and cystoscopy were negative. Subsequent cystoscopy 1 week later showed bloody urine from the left kidney and a defect in the left

pyelogram. Postmortem revealed a hypernephroma of the left kidney with metastases in both lungs and chronic passive congestion of the liver and spleen.

G von Illyés (Ztschr f urol Chir 27 39 (Apr 9) 1929) describes a case of hypernephroma in a man, aged 69. It was as large as 2 fists and was located at the lower pole of the left kidney. In spite of its size, it was **extirpated** radically without removal of the healthy kidney.

An unusual history of hypernephroma is described by K V Trubshaw (Brit M J 1 216 (Feb 11) 1928). In August, 1924, a girl aged 15, was admitted to the Chester Royal Infirmary with a hard mass occupying the left loin and a practically normal urine. There was a history of attacks of vomiting and pain in the left side for some years, the tumor was noticed only recently. She was emaciated and had a remarkable growth of hair over all the limbs and abdomen. There was no abnormality of the sex organs and menstruation had not yet begun. With the diagnosis of hypernephroma, the kidney was explored and was found fixed and surrounded by a reddish, vascular growth. A small piece of tissue was excised and the microscopic diagnosis was hypernephroma. About 3 months later she was greatly emaciated and the end seemed inevitable. However, she continued in this state for about 9 months and then began to put on weight, the tumor and the hair growth disappearing. Three years from the original admission she was readmitted in apparent good health except for a recurrence of pain in the left side, beginning 3 weeks before. A rounded, tense mass was found un-

der the old scar and the urine contained pus and a vigorous growth of bacillus coli. Pyelograms revealed a greatly distended pelvis and calices. X-ray of the thorax and long bones showed no metastases. Exploratory operation showed the kidney to be densely adherent to the surrounding tissues and to the peritoneum. As she took the anesthetic badly, a drain was inserted and a large quantity of pus evacuated. Three days later the wound was again opened and subcapsular **nephrectomy** was done. Report of the same pathologist at this time was "much inflammatory change with patches of acute inflammation and small abscesses, very little renal tissue left—no evidence of tubercle, new growth, or hypernephroma. When last seen, 3 months after operation, the wound was practically healed and her general condition immensely improved.

Metastases in the right kidney, liver, lungs, and jaw, from a hypernephroma of the left kidney, was observed by C. F. Branch and R. H. Norton (New England J. Med. 198:559 (May 3) 1928). A dentist had made several attempts to close a discharging fistula on the lingual surface of the mandible opposite the inferior right second bicuspid. The treatment had consisted of pumping 5 per cent phenol solution through the root canal out through the fistulous opening over a period of 18 months. A growth had developed in the vicinity and included the fistula. It resembled an epulis and was removed by radical operation and the application of actual cautery. The pathological report at this time was an epidermoid carcinoma. The growth reappeared in 5 months and 4 plat-

inum seeds of radium amounting to 148 millicuries were implanted for 10 days. At that time the patient had a severe fall, injuring the spine and left hip. Ten days later she appeared to be dazed and showed a left sided hemiplegia with rapid and irregular heart action. The following day there was a bilateral paralysis, the patient became comatose and died on the third day.

The removal of a well encapsulated primary hypernephroma of the right lobe of the *liver* is reported by T. L. Ramsey (Ann. Surg. 90:41 (July) 1929). There was only moderate hemorrhage and the cavity was packed with iodoform gauze and rubber tissue. The patient died the same day. Autopsy was not permitted, but death was presumed to be due to hemorrhage from the liver.

A similar case is reported by I. Abell (J. A. M. A. 90:412 (Feb. 4) 1928) in a girl aged 13 months. The tumor was distinctly encapsulated, and extended from the tip of the twelfth rib to a point slightly to the left of the umbilicus. The other abdominal organs were normal. The patient made an uneventful recovery and presented no evidence of recurrence in the 17 months following operation.

A case of regression of hypernephroma metastases is reported by H. C. Bumpus, Jr. (J. U. 20:185 (Aug.) 1928). A **nephrectomy** was done on a man 59 years of age, for hypernephroma invading the renal pedicle. Fifteen months later he complained of chronic cough with occasional bloody sputum and gave a history of 3 attacks of transitory hemiplegia followed by dragging of the left foot. X-ray of the chest disclosed multiple

metastatic areas in both *lungs*. Five months later all evidence of these nodules had disappeared. At subsequent examinations 2½ years later and 5 years after operation, the patient appeared to be in excellent health.

R Paolucci (Ann ital di chir 6 666 (July) 1927) reports benign suprarenal tissue, with several small tumors of granulation tissue, in the *hermal sac* of a boy of 17. This demonstrates that there may be aberrant suprarenal bodies in any tissue related embryologically to the suprarenal tissue and that they may form true tumors, either benign or malignant.

H O Neumann (Arch f Gynak 131 574 (Jan 2) 1928) found nodules of suprarenal cortex tissue in the *genital organs* of a number of newborn infants and of a few older girls. He describes a bilateral ovarian tumor in a woman aged 44, the nature of which is doubtful, but he is inclined to believe that it is a carcinoma with partial hypernephroid structure. A ganglioneurofibroma of the broad ligament was found in a 14 year old girl.

The removal of bilateral *pelvic* tumors from a woman of 37 is described by W Komocki (Virchows Arch f path Anat 269 70 (1928)). No other trace of ovaries could be found, though the patient had menstruated normally up to the time of operation. The histologic examination of the tumors showed hypernephroma.

Gough (Med Press and Circ 127 536 (June 26) 1929) describes a hypernephroma of the left *ovary* in a woman aged 25. Menses had appeared at 13, were regular up to the age of 20, when they ceased and she experienced changes in her secondary sex

characteristics. She developed a deep bass voice and was forced to shave daily. Her sexual feelings were normal. There were 2 or 3 pints of straw colored fluid in the peritoneal cavity and the tumor was bluish with pinkish-orange excrescences on its surface. There were no surrounding adhesions and the other viscera were normal. The mass was removed. Her menses reappeared 4 weeks after operation and have been regular since.

O Gragert (Arch of Gynak 136 167 (Mar 20) 1929) reports a case of hypernephroma metastasis in the *vagina* and reviews 10 similar cases previously reported. A bloody vaginal discharge for 6 months was found on examination to be due to an ulcerated dark red, pedunculated tumor about 2 cm in diameter on the anterior wall of the vagina. Microscopic examinations of the excised tumor revealed that it was hypernephroma. Three months later the original tumor, as large as a man's fist, was removed from the upper pole of the left kidney.

A similar case in a woman aged 45, is reported by C Fleischmann (Zentralbl f Gynak 53 1458 (June 8) 1929). Metastasis in the *vagina* brought the patient to the physician 3 months before symptoms of the primary tumor in the kidney were noted.

Metastasis to the anterior wall of the *vagina* occurred in H U Hirsch-Hoffman's patient, also (Zentralbl. f Gynak 52 1970 (Aug 4) 1928), a woman aged 71. There was a sudden onset of severe leukorrhea which soon became bloody and a hard, ulcerated tumor about the size of a hazel nut was found on the anterior wall of the vagina. Biopsy revealed growth of

a suprarenal cortex type, resembling in many places the zona glomerulosa and fasciculata. An accurate diagnosis was made and the vaginal tumor extirpated as radically as possible. Necropsy 4 months later revealed suprarenal tumor.

In embryos from 12 to 16 mm in length, the anlage cells of the adrenal are so situated with respect to the liver, kidney, ovary, testicle, epididymis, and uterus, that the possibility of adrenal-cell inclusions in these organs can be readily understood. According to Broman, adrenal rests have been found in the rete testis, epididymis, and paradidymis, on the spermatic cord, in, above, and below the inguinal canal, in the ovaries, on the Fallopian tubes, in the retroperitoneal tissue below the poles of the kidneys, along the spermatic and ovarian veins, in the iliopsoas muscle at the brim of the pelvis, at the sacro-iliac synchondrosis, in the renal capsule and kidney substance, on the walls of neighboring vessels, in the renal and solar sympathetic plexuses, between the transverse colon and the spleen, in the right lobe of the liver, and in the pancreas.

Primary hypernephroma occurs most frequently in the kidney, but may develop in any of the tissues in which adrenal rests have been found. A. E. Bothe (Ann Surg 88 1028 (Dec) 1928) reports a primary extrarenal hypernephroma occurring in a man 77 years of age, who complained chiefly of nausea, epigastric pain, and post-prandial abdominal distention and discomfort relieved by the eructation of gas. Examination revealed a mass the size of a grapefruit in the upper right quadrant, which was somewhat tender and moved with

respiration. The tumor was found to arise from the soft tissues in the region of the right adrenal gland. The liver contained metastatic tumors, and the patient died on the fifth day after the operation from bronchopneumonia. The predominant cells of the tumor were of the large polygonal type, consisting of a large nucleus surrounded by a clear vacuolated cytoplasm. There were many mitotic figures.

Cardia (Tumori (Sept-Oct) 1929) thinks that while in most of the cases hypernephroma of the kidneys originates in suprarenal rests, in some cases the tumor may develop from the renal elements. These tumors may be divided into those of the cortex and those of the medulla. In a patient, aged 56, slow evolution of the disease was present for 5 years, and there were 2 severe attacks of hematuria which led to a nephrectomy.

Gerwer (Arch f Psychiat (Sept. 18) 1929) reports 2 cases of hypernephroma, 1 in a man aged 62, and the other in a woman aged 50, with death from metastases to the *cerebrum*. [A persistent, apparently causeless afternoon fever in a patient of middle age may for many months be the only evidence of a hypernephroma. Little may be expected from the treatment of hypernephroma by radiation with x-rays or radium.—Ed.]

**PROGNOSIS**—E. S. Judd and J. R. Hand (J Urol 22 10 (July) 1929) believe that carcinomas of the renal cortex are extremely malignant and are often well advanced before they produce symptoms. The most highly malignant type are the alveolar carcinomas in which but little attempt at cellular differentiation is made, whereas adenocarcinomas are less

malignant, as judged by their clinical course. All of these malignant tumors should be submitted to gradation on the basis of cellular differentiation before it will be possible to arrive at a more exact knowledge of their prognosis. Many of these patients have lived several years and then died of other causes. Even some with metastases at the time of operation were apparently arrested for a time. **Nephrectomy** even in these cases offers a reasonable degree of palliation. Of their patients, 106 lived from 3 to 22 years, leading them to believe that surgery will cure a definite proportion of them.

**Treatment**—The slow growth and late metastases of hypernephroma warrant its removal in any case not showing metastases, with the opposite kidney competent and the patient's general condition sufficient to withstand operation. In the opinion of O. S. McCown (Memphis M. J. 6: 25 (Feb.) 1929) practically all of them break through the capsule and metastasize eventually, increasing the operative and ultimate mortality. The mortality, according to MacKechnie, is 25 per cent and to Garceau, is 30 per cent. This can be greatly reduced by early operation. Two cases are reported, one a man aged 47, on whom **nephrectomy** was done 6 months after the onset of the usual symptoms. The patient made an uneventful recovery and was living and well 9 years after. The other, a man aged 45, was operated 5 years after the onset of symptoms and remained well for 2 years when he was shot and killed. Both these tumors were of the lower pole and were verified by microscopic diagnosis. These cases show the possible results of operation.

## TUMORS —VARIOUS TYPES—

The relationship between arterial hypertension and tumor of the suprarenals, with a study of 2 such cases, is discussed by L. Langeron and P. Loheac (Presse méd. 36: 1153 (Sept. 12) 1928). Two conclusions are reached: (1) that primary tumors of the suprarenal glands may explain the pathogenesis of apparently primary or essential hypertension. One type consists of paroxysmal hypertension, is associated with *paragangliomas*, and is sufficiently characteristic to be recognized. The second type of continuous hypertension may be caused by *epitheliomas* of the cortex and presents nothing characteristic clinically; (2) the fact that suprarenal tumors accompanied by hypertension, regardless of their histologic construction, are invariably richer than normal in epinephrine, leads one to believe that this high epinephrine content must constitute the common pathogenic content by which all these tumors lead to arterial hypertension.

The same relationship is mentioned by M. C. Pincoffs (J. A. M. A. 93: 63 (July 6) 1929). He reports a young woman with frequent attacks of palpitation of the heart for 10 years, increasing in frequency and associated with heat and throbbing in the head, heat in the arms, difficulty in breathing, nausea and coldness in the nose and knees. In severe attacks she became cyanotic. Vomiting relieved her. She had no attacks after going to bed. Between attacks the physical examination was normal, blood-pressure 120/80. During attacks blood-pressure rose to 260, pulse rate from 90 to 110. Forcible heart action was visible and the patient reclined without speaking. The urine showed al-

bumin and there was an intermittent glycosuria. Electrocardiogram during attack showed high "T" waves as in hyperthyroidism. Diagnosis of suprarenal tumor was made and exploration done. The left suprarenal was normal, but on the right kidney there was a mass which, dissected out with difficulty, weighed 150 Gm (5 ounces). The patient suffered considerable shock, but recovered. There were no further attacks. The tumor was of the *paraganglionic type*. In discussing this paper Roundtree mentioned an identical case treated at the Mayo Clinic.

A case is reported by Rabin (Arch Path 7 228 (Feb) 1929) of a woman aged 45, who for many years suffered from hypertension and nervous manifestations similar to those of exophthalmic goiter. Following a fever for 1 week, she developed signs of meningitis and died in coma. Autopsy revealed marked hypertrophy of the heart, generalized arteriosclerosis, chronic passive congestion of the viscera, infarcts of the lungs and *pheochromocytoma* of the right suprarenal medulla.

A case of *neuroblastoma* of the right suprarenal in an 18-day-old infant, is reported by S M C Van Veen (Jahrb f Kinderh 122 214 (Dec) 1928). It was of the Pepper type with enormous hepatic metastases. Of the 2 specific types, the Pepper is generally small, the liver metastasis voluminous and sometimes there are metastases in other viscera. The other, or Hutchison type, is of a larger primary tumor with slower growth and metastases to the flat bones, especially the skull. Other types of bones and the lymphatic system may be involved.

N B Capon (J Path and Bact 31 659 (Oct) 1928) cites a similar case of the Pepper type in a patient 6 weeks old. The marked abdominal distention was thought to be an enlarged liver and spleen. Scattered in the subcutaneous tissues generally, and especially on the infant's back, were numerous hard nodules, the largest a half inch across. None of these masses were breaking down though one appeared to be adherent to the overlying skin. There was no visible hemorrhage nor jaundice. Congenital sarcoma and diffuse tuberculosis were considered, but a diagnosis was not made. At autopsy the liver, enlarged by metastases, weighed 18 ounces, the suprarenal glands were enlarged, hemorrhagic and of firm consistency and contained *neuroblastomas* appearing as white nodules of varying size.

A study of 9 cases of *sympathetico-blastomas* of the adrenal occurring in children from 3 weeks to 3 years of age was made by M Wollstein (Surg Gynec Obst 44 774 (June) 1928). These tumors are congenital and malignant. Six occurred in girls. The diagnosis was proven by microscopic examination at operation, or autopsy. There are 5 types according to location. There was 1 case of the simplex type showing a small nodule in an otherwise normal left adrenal with no metastases. The second type was represented by 2 cases with hepatic metastases causing great enlargement of the liver. The third type of which there were 2 cases, corresponded to the Hutchison type with metastases in the skull, ribs, pelvis, clavicles, liver and dura. The 2 cases of the fourth type were characterized by an inoperable tumor

lying in front of the vertebral column between the adrenals and the kidneys, which represented a second tumor focus. In the 2 cases of a fifth type there were globular tumors which were easily removed before metastases had developed. One of these is living 17 months after operation, which is the longest survival on record. The tumors showed large adult nerve cells and sympathetic nerve cells of an embryonic type with numerous fibrils representing axis cylinders. The most rapidly fatal cases are those in which the chief sign is hepatic enlargement.

X-ray examination of a boy aged 6, revealed a coral shaped area of calcification above the left kidney, according to N. Gellerstedt and R. Hjelm (Upsala Lakaref. Forh. 34: 271 (June 16) 1928). Necropsy revealed this as a tumor in the right suprarenal, probably developing from the cortex, consisting of sympathetic ganglion cells and nerve fibers and believed to be a ganglioneuroma. Because of the presence of many young and immature cells and the structure of the nerve tissue it was classified as a *ganglioblastoma*.

### AGRANULOCYTIC ANGINA.

—Since the observation of cases of profound toxemia preceded by acute inflammations of the pharynx and oral cavities, with regional lymphadenitis, marked leukopenia, agranulocytic in type, accompanied by chills and high fever, a controversy has arisen as to the propriety of classifying this syndrome as a disease entity. Lasch (Med. Klin. 25: 425 (Mar. 15) 1929) believes it is not an independent disease, but rather the symptom complex of a severe rapidly

developing sepsis. Rose and Houser (Arch. Int. Med. 43: 533 (Apr.) 1929) suggest the substitution of a more general descriptive term for the present one such as "sepsis with agranulocytopenia" or "agranulocytic infection."

Aubertin and Levy (Arch. d. mal. du coeur 21: 369 (June) 1928) conclude that the condition presents the following features: (1) A marked predominance in the female sex, (2) a severe infectious condition, (3) ulceronecrotic lesions which are most marked on the buccopharyngeal mucosa, (4) a slight or intense icterus in the majority of cases, (5) pronounced leukopenia with considerable reduction or almost complete disappearance of the polymorphonuclear neutrophils, (6) a fatal outcome in a few days, (7) an alteration in the bone marrow, chiefly a disappearance of the granular white cells. They also state there is an absence of the following features: (1) Definite etiology, (2) clinically appreciable tumefaction of the hemopoietic organs, (3) definite changes in the erythrocytes and platelets, (4) signs of hemorrhagic diathesis, (5) metaplasia of the hemopoietic organs, (6) common mechanisms of defense about the ulceronecrotic lesions of the mucous membranes.

*Symptomatically*, Hueper (Arch. Int. Med. 42: 893 (Dec.) 1928) describes the progress of events as the following: Sudden continuous high fever, occurring in good health followed by a fast irregular pulse of poor quality, malaise, weakness, profound fatigue, dysphagia and dyspnea. Chills and soreness of the throat occur in 3 to 4 days. In about 50 per cent of the cases jaundice develops and death is



usually preceded by coma, the former occurring in 2 to 7 days. Occasionally a chronic case is seen in which the condition persists for several weeks but is usually fatal. Only 6 cases of recovery are on record.

The tonsils are enlarged, filled with yellow and white plugs and soon become covered with a dirty white or grayish coat which, on removal, leaves an ulcerated surface. Hemorrhage may occur and fetor is present. Enlargement of the liver and spleen with anal and vaginal ulcerations occur. The most important findings are in the blood where leukocytic counts as low as 900 have been reported. The granulocytic cells are reduced in number and may even finally disappear. Immature forms are not present. Strangely, the hemoglobin, red cell count, coagulation and bleeding time remain normal. Blood cultures are positive in only about 10 per cent of cases and show many types of organisms including *B. perfringens*, *B. coli*, *staphylococcus* and *pneumococcus*.

The disease is much more common in women than men and few cases are seen under 20 years of age. It is apparently not contagious.

In the differential diagnosis, one must consider (1) diseases showing agranulosis and oral necrosis such as influenza, typhoid fever, septicemia, acute leukopenia, leukemia and aleukemia, (2) conditions of agranulosis without oral necrosis such as Hodgkin's disease, pernicious anemia, military tuberculosis, arsenic and benzene poisoning, (3) diseases with oral necrosis but without agranulosis such as diphtheria, Vincent's angina or monocytic angina.

Aubertin and Levy, referred to above, reporting on the treatment say

that injections of acridine, trypanflavine, mercurochrome and colloidal silver have been tried. Specific anti-streptococcic serum seemed to have a favorable effect in 1 case, in another protein therapy. Radiotherapy of the long bones, in small doses, was believed of advantage. Transfusions, although theoretically of assistance, proved of only slight value and all modes of attack from a curative standpoint were only temporary and very disappointing.

**AIR PASSAGES.—MALIGNANT TUMORS.**—Diathermy for the treatment of tumors of the upper air passages was used by E. Schmiegelow (Hospitalstid 71 963 (Sept 6) 1928), in 8 cases with 3 recoveries. He considers the electrothermic method justified in grave cases of otherwise inoperable fibroma of the nose and throat. He does not hesitate to remove the entire hard palate and alveolar process to obtain free access to the tumor. The treatment may require 2 or 3 hours or longer, but there is surprisingly little operative shock. For cancer in the nose and throat, he thinks that radium may be preferable to surgical diathermy.

**ALBUMINURIA.**—E. Andrews, W. A. Thomas and K. W. Schlegel found that in the early stages of an albuminuria, there is present a protein foreign to the blood proteins. Later, however, normal serum proteins are excreted. E. Andrews, W. A. Thomas and W. F. Welker (Arch. Int. Med. 43 139 (Jan) 1929) then found a non-toxic peptone and a highly toxic protein in such form that it passed through a collodion membrane. They offer the

hypothesis that certain types of albuminuria are detoxicating mechanisms for eliminating poisonous products of protein metabolism

It has been known for years, of course, that focal infections and toxemias generally are apt to lead to albuminurias which disappear when the sources of infection, etc., are removed. C. D. Mercer (Ann Int Med 2 667 (Jan) 1929) insists that urine examinations be made before immunization by diphtheria toxin-antitoxin because he found after injections of this material not only an increase of albuminuria in those children already having it from infected tonsils, etc., but an appearance of it from the injection. No adequate data are given, however, of its duration or significance.

In eclampsia and albuminuria, J. Young (Brit M J 1 91 (Jan 19) 1929) found recurrence of the condition (or interruption of *pregnancy*) in more than 50 per cent of patients who had succeeding pregnancies. This tendency to recurrence possibly had no relation to a renal defect persisting from the first attack, but nevertheless several cases of nephritis probably resulted from the toxemia. Pre-natal care must, therefore, be redoubled in such cases, and, in some, definite advice should be given as to the inadvisability of future pregnancies.

M. Riviere (Gynec et Obst 19 100 (Feb) 1929) reports that albuminuria in *pregnancy* is much more common in syphilitics.

The functional albuminurias divided into (1) orthostatic, (2) digestive, (3) cyclic, have received a fair amount of study, especially the orthostatic. Some doubt is cast on the importance

of lordosis by a number of observers, inasmuch as only 3 in 25 lordotic children showed *orthostatic* albuminuria. J. A. Samuels (Am J Dis Child 37 367 (Feb) 1929) states that withholding of food in the mornings causes *orthostatic* albuminuria to disappear. Even a glass of milk causes reappearance. Curiously enough, the administration of lime water after meals renders the urine free of albumin suggesting that calcium has something to do with the condition. A suggested test by A. Narath (Monatschr f Harnkiankh u sex Hyg 2 97 (July) 1928) for *lordotic* albuminuria consists in having the child place a leg on a high step or stool with the knee and hip joints flexed. Then successive samples of urine are examined, the child remaining in this position. If the albuminuria persists, it does not mean, however, that the condition is necessarily due to nephritis.

Certain authors believe that *orthostatic* albuminuria is usually an indication of a tuberculous diathesis or susceptibility, and that such individuals are of Stiller's asthenic habitus.

*Digestive functional* albuminuria is said to be due to hepatic and gastric disturbances or to the consumption of certain foods such as eggs, milk, cheese, etc., for which the individual lacks proper digestive capacity.

*Cyclic* albuminurias are usually an accompaniment of definite chronic diseases such as gout, arthritis, diabetes, etc.

**ALBUMIN TEST.**—Bose (Ind M. Gaz 64 17 (Jan) 1929) reports a reagent for detecting albumin in urine, having the advantages over the *nitric acid* ring test of not precipitating mucin and of being per-

fectly harmless if spilled. A filtered saturated water solution of saccharin is overlaid by the urine. A sharply defined ring slowly appears at the junction of the 2 fluids.

**ALCOHOLISM.**—Of 198 cases of alcoholism studied by J. L. Richardson and M. A. Blankenhorn (*Amer J M Sc* 176 168 (Aug) 1928), 51 were acute and 61 were chronic. Neuritis was present in 18 cases, cirrhosis of the liver in 14 cases, and delirium tremens in 5 cases. Acute alcoholism today is characterized, as a rule, by early loss of consciousness in many cases, a slight febrile reaction and a transient albuminuria, in addition to such signs and symptoms as tremor, hallucinations, and marked nervousness. Alcoholism may be the sole cause of death, but contributing factors must be borne in mind. The authors cite a case of cerebral hemorrhage accompanying convulsions in acute alcoholism. Diabetic coma may be precipitated in acute alcoholism, while acute alcoholism and plumbism may cause death. Auricular fibrillation and even ulcerative colitis, have been caused by alcoholism. Chronic alcoholism has changed in the respect that the daily "tipster" has given way to an individual who indulges in frequent sprees, but not daily drinking. Consequently, delirium tremens is less common. *Alcoholic neuritis* at present is characterized by rapid onset, usually less than 4 weeks before definite muscular weakness appears. Weakness is the outstanding complaint in 72 per cent of the cases. Alcoholic cirrhosis is essentially the same as before prohibition. G. H. Bigelow (*New England J Med* 198 227 (Mar 22) 1928) contends that the vast majority of cases of "alcoholic deaths" in Massachusetts are apparently due to the excessive use of "good pure alcohol."

**DIAGNOSTIC TESTS.**—From a study of acute intoxication, a method has been determined by E. Bogen (*Am J M Sc* 176 153 (Aug) 1928) to measure quantitatively the degree of intoxication from alcohol. To measure the alcoholic content of the breath a solution of two-thirds of 1 per cent of potassium bichromate in concentrated sulphuric acid is diluted with

an equal quantity of distilled water and a current of air containing the alcohol in gaseous form bubbled through it. The color change, from reddish-yellow to greenish-blue, is then measured by comparison with a series of standards previously made by the addition of known amounts of alcohol to 5 c.c. ( $1\frac{1}{4}$  dram) portions of the reagent mixture in sealed tubes. To measure the alcohol content in the urine, blood, spinal fluid, tissues, etc., place 1 c.c. (16 minims) of the specimen in a test tube. A purified air current is bubbled through 5 c.c. ( $1\frac{1}{4}$  dram) of the reagent for 10 minutes, while the tubes are immersed in a boiling water bath. When acetone is present in the unknown solution it must be removed by the addition of 1 c.c. (16 minims) of Scott Wilson's alkaline mercuric cyanide reagent before aeration. The amount of alcohol present can be determined by color comparison with the standards, or, more precisely, by titration as follows.—To the heated and aerated reagent solution, add 3 drops of a 1 per cent potassium ferrocyanide solution and titrate with a standard solution of N/30 ferrous ammonium sulphate solution until a deep blue color appears. Each 2 c.c. (32 minims) of the standard solution less than 10 c.c. ( $2\frac{1}{2}$  drams) required for its titration, represents 1 mg. ( $\frac{1}{65}$  grain) of alcohol when 1 c.c. (16 minims) of the unknown is mixed with 5 c.c. ( $1\frac{1}{4}$  dram) of the reagent. According to his interpretation, 1 to 2 mg. ( $\frac{1}{65}$  to  $\frac{1}{32}$  grain) represents "border-line" intoxication, and 3 mg. ( $\frac{1}{20}$  grain) or over, absolute intoxication.

J. Purves-Stewart (*Practitioner*, 120 175 (Mar) 1928) defines a drunken person as one who has taken alcohol in sufficient quantity to poison the central nervous system, producing a temporary disorder of the function so as to render him unable to execute the occupation in which he was engaged at the time. In his opinion, the best physical evidence of all is a positive reaction for alcohol in the cerebrospinal fluid. There is no short cut to the accurate diagnosis of drunkenness. A careful and systematic clinical examination must be made.

According to W. D. McNally and H. C. Embree (*Arch Path* 5 607 (Apr) 1928), the human body normally contains about 0.003 per cent of alcohol. A chemical

analysis of the fluids or tissues of the body showing alcohol to be present in excess of 0.01 per cent indicates that alcohol has been taken recently. The presence of 0.4 to 0.5 per cent of alcohol represents a condition of drunkenness, and for a man of average weight, means that about 300 Gm (10 ounces) of alcohol has been taken. This amount would be present in about a pint (500 c.c.) of ordinary whiskey. Twice this amount, or from 0.8 to 1 per cent of alcohol, in the body, will cause death.

### ALLERGY.—SYMPTOMS.—

The allergic syndrome manifests itself in varied and peculiar manners. Conditions such as hay-fever, vasomotor rhinitis, eczema, urticaria with angioneurotic edema and in some gastrointestinal disturbances such as dyspepsia nervosa and mucous colitis, purpura and migrainoid headaches are held as allergic phenomena by C. H. Eyermann (J. Missouri M. A. 26:481 (Oct.) 1929).

**DIAGNOSIS.**—To establish a proper diagnosis, Eyermann believes a most painstaking and detailed history of each individual patient must be made. When hay-fever, vasomotor rhinitis, urticaria or asthma manifest themselves alternately, the suspicion of allergy is increased. Allergic phenomena are known to disappear temporarily following a febrile reaction only to return later. This also substantiates the diagnosis.

Occupation not only of the patient, but of all members of the family is an important factor in arriving at a diagnosis. The question of seasonal or non-seasonal symptoms must also be answered. Environment is another extremely important factor. This includes consideration of the type of furniture, house pets, plants, insecticides, talcum powder, etc. A dietary history should be taken.

Confirmation of the allergic state may be obtained by performance of the skin sensitization tests. However a positive skin test merely indicates the allergic state and does not preclude this particular substance as the chief offender. The allergic state may exist in the presence of a negative skin test. This is shown to be the result of the receptivity to the allergens of some organs of the body and possibly not the skin, by H. L. Alexander (M. Clin. North America 11:399 (Sept.) 1927). He has also shown by experimentation that repeated negative tests may be followed by a positive test, all other things being equal, merely because of a change of the site of the test. Larger reactions were consistently found on the back and abdomen than elsewhere. To confirm the etiologic diagnosis, the symptoms should be capable of reproduction by a deliberate exposure to a sufficient amount of the offending allergen either by ingestion or inhalation.

The eosinophilic reaction is frequently recognized as an allergic phenomenon. G. T. Brown (J. Lab. and Clin. Med. 12:1145 (Sept.) 1927) studying 346 cases found an average of 7 per cent eosinophils in asthma, 5½ per cent in seasonal hay-fever, 7 per cent in perennial hay-fever, 5 per cent in eczema and 4 per cent in urticaria. He also observed that the sputum eosinophils were parallel in number with the blood eosinophils.

Three factors are necessary for the diagnosis of an allergic condition, according to Eyermann (*loc. cit.*). They are (1) exhaustive and detailed clinical history of the presenting symptoms, the antecedents, environment

and the diet of the patient, (2) the performance and intelligent interpretation of the skin sensitization tests and (3) the demonstration of eosinophils in both the blood and the sputum

According to C Sweet (Arch of Pediat 44 478 (Aug) 1927), fats and carbohydrates have little influence upon allergy in children. The unsplit protein molecules are the offenders and the more digestible the protein, the less is the tendency for it to cause an allergic reaction. He advises a variation and periodic changing of the cereal proteins and believes the quartz lamp and sun's rays are of great value. Local application of ammoniated mercury ointment from 1 to 5 per cent are helpful. Elimination of all foci of infection is obviously desirable.

**TREATMENT**—In severe cases of allergy F Vollbracht (Wien klin Wchnschr 40 549 (Apr 28) 1927) advises the use of **adrenalin** preceded by 2 c c (32 minims) of **camphorated oil**. **Caffein** is sometimes effective also. When the offending agent is known, specific desensitization by progressively increasing doses of the **allergen** is indicated. Aggravation of the symptoms by too large doses calls for the use of 3 to 5 c c (5 to 8 minims) **adrenalin solution** subcutaneously. When the offending noxa cannot be discovered, **non-specific protein therapy** may be used. Peptone, milk, human blood and serum are frequently used for this purpose.

Recently **ephedrin** has given very satisfactory results. About 2 c c (30 minims) of a 1 to 1.5 per cent solution is dissolved in a cajuput oil preparation and has been instilled by the supraglottic method by Caulfield

(Canad M A. J. 20.498 (May) 1928) in 17 cases of *bronchial asthma*. In only 2 cases did it give unsatisfactory results. **Trypsin** in the dosage of 2 Gm (30 grains) 3 times daily has also yielded gratifying results.

**AMAUROSIS**.—Renedo (Med iberica 1 311 (Mar) 1929) who records an illustrative case, emphasizes the extraordinary rarity of double *hysterical amaurosis* in contrast with unilateral amaurosis, which is much less unusual, and more or less marked amblyopia of one or both eyes, which is much more frequent and easy to diagnose. Renedo's patient was a woman, aged 21, who suddenly became blind. Examination made the following day showed that the eyeball from cornea to retina was completely normal. Lesions of the optic nerves, chiasma, optic radiations, or occipital lobe were excluded by the absence of any other symptoms, such as paralysis or psychical changes. On the other hand, the presence of hysteria was shown by anesthesia of the palpebral conjunctiva, with conservation of corneal sensibility, lack of sensibility to contact and to sensations of heat, cold and pain in the areas supplied by the first and second branches of the trigeminal nerve, anesthesia of both forearms, feet, and soft palate. Complete recovery of vision followed the subcutaneous injection of sterile water, first in the left and then in the right temporal region.

[Before making a diagnosis of hysterical blindness it is important to rule out disease of the retinal blood-vessels, retrobulbar neuritis should also be eliminated as a possible factor. The retinal blood-pressure should

be studied to eliminate the possibility of increased intracranial pressure.—Ed ]

**TREATMENT.**—Cases in which an artificial pupil may restore vision are classified by D T Atkinson (J. Ophth, Otol and Laryng 33 155 (May) 1929) as follows

1 Those in which, as the result of iritis, the pupil has become adherent to the anterior capsule of the lens, the pupillary opening being entirely obliterated by organized lymph

2 Traumatic cases in which, for instance, a corneal wound has been closed by an incarcerated iris with resulting pupillary occlusion

3 Partial opacities of the cornea due to gonorrheal or other corneal ulcerations

4 Postoperative occlusion of the pupil, usually occurring in cases of cataract and due to organized blood or lens tissue or a rolled-up capsule adhering to the pupillary margins

5 Cases of cataract of the nuclear type with arrested development

Cases in the first group can be benefited only by **iridocapsulotomy with extraction of the lens**. This is applicable to all cases except those of the young

In cases of the second group the best procedure is **detachment and excision of the iris**. In those of the third group **iridectomy** below the clear portion of the cornea is indicated. When only a small portion of the cornea is clear, the section should be made through the sclera instead of the cornea

In cases of the fourth group **Kuhnt's operation** is indicated. Optical iridectomy is never contraindicated in the nuclear type of senile cataract. It lessens the risk of iritis and glaucoma

**AMBLYOPIA.**—A Fuchs (Med Klin 1533 28 (Sept) 1928) reports a case of *postpartum amblyopia* cured by **transfusion**. The patient, aged 29, had a severe hemorrhage after the birth of twins, she had had albuminuria before her confinement. Fourteen hours after delivery her visual acuity was greatly diminished, she could count fingers only at a distance of 40 inches, and could recognize friends only when they were standing close to the bed. The papillæ were pale, the vessels contracted, and the choroids grayish white. The **transfusion** of 250 c c ( $\frac{1}{2}$  pint) of blood was followed by immediate improvement, and the patient was enabled to count fingers at a distance of 10 feet. Next day there was still greater improvement, the papillæ were no longer blunted, the retinal edema had disappeared, and the vision was 6/18. On the following day a further 250 c c ( $\frac{1}{2}$  pint) of blood was transfused, and 3 days later the fundi appeared to be healthy, the formerly contracted vessels were of normal caliber, and the papillæ were clearly defined. Six weeks after the confinement the papillæ and choroids were of natural color and the vision was normal, in the lower part of the left fundus alone, did the vessels appear contracted. The field of vision showed a slight contraction in its upper part—25° for red, 30° for black. The author remarks that severe hemorrhage produces such changes in persons who are not healthy, these sequels were not observed during the war. The *prognosis* of this condition is very unfavorable, especially when it occurs immediately after delivery. One writer has observed 14 cases of amblyopia of this nature, 11 of these

terminated in amaurosis, and in 3 patients the condition was bilateral. Local treatment, including massage, paracentesis, sclerotomy, and iridectomy, was not effective.

**TOXIC.**—Among 108,142 eye patients, H. M. Traquair (Lancet 2 1173 (Dec 8) 1928) found 1088 cases of *tobacco amblyopia* (10 per cent). Nearly all the patients used between 2 and 4 ounces (60 to 120 Gm) of tobacco weekly. During the 14 year period, the annual percentage of tobacco amblyopia, calculated on the total number of ophthalmic out-patients, varied from 0.41 to 1.48. The monthly incidence, in this case the actual number of patients with tobacco amblyopia, shows a peak in the late spring, the highest month being April and the lowest December. It must be noted that the curve indicates the incidence of application for advice, not the incidence of onset of the amblyopia, which is considerably earlier. As the onset is gradual, patients are usually unable to give more than a vague account of the approximate time when they first noticed visual symptoms.

[The value of this study would be greatly enhanced if the amount of alcohol consumed were also known, as some authors believe that in order to produce amblyopia the substances must act in conjunction.—Ed.]

B. Y. Alvis (Arch Ophth 2 328 (Sept) 1929) reported the case of a patient who ingested *ethylhydrocupreine* in doses of 4 grains (0.26 Gm) every 5 hours with a glass of milk during 3 days and nights, until she had taken 58 grains (3.75 Gm) in all. During the third night she had a high temperature (104° F—40° C) and was somewhat irrational. Her father,

acting as nurse, placed cold applications on her forehead with 2 cloths of different colors. She was able to distinguish between the 2 cloths until late in the night, when she finally slept. On awakening in the morning, she was unable to distinguish light. Examination made about 5 hours later, revealed widely dilated pupils, discs very pale with slightly blurred margins, retinal arteries practically obliterated, so narrowly were they contracted, and small threadlike retinal veins. In the right macula there was a cherry spot in a moderately edematous retina, no cherry spot appeared in the left macula, but a little to the temporal side there was a round deposit of brownish pigment, apparently old.

As soon as the diagnosis of ethylhydrocupreine poisoning was made, *i. e.*, about 12 hours after the onset of amaurosis, **nitrites** were given in increasing doses. General elimination was instituted, in the form of **potassium iodide** and **pilocarpine** for diaphoresis. **Hot fomentations** were applied to improve the circulation of the eyes. Later, increasing doses of **strychnine** were administered. Four months later the pupils were wide and reacted sluggishly to light. The patient said that everything was seen through a purple haze which prohibited the differentiation of colors. Vision in each eye was 20/75. The visual fields were restricted temporally from about 25 to 30°, nasally from 15 to 20°, below from 15 to 30°, and above 15°.

**TREATMENT.**—A. and W. Meers (An de la Fac de med Montevideo 14 114 (Jan) 1929) report that the use of subcutaneous injections of from 0.015 to 0.030 Gm ( $\frac{1}{4}$  to  $\frac{1}{2}$

grain) or more of **strychnine** in increasing doses, according to the patient's tolerance, yielded the best results in the treatment of *alcoholic amblyopia*

**AMPUTATIONS.**—The circulation of the blood in skin and muscle flaps in osteoplastic amputations on the lower extremities was studied by Chasin (Arch klin Chir 155 630 (Aug 9) 1929) by a method devised by Schor and himself, in which bismuth and glycerine were injected into a large vessel of the extremities and x-rays made. It was found that Pirogoff's osteoplastic flap, developed on a bony pedicle, contains more blood-vessels than a flap made only of soft tissues. The experimental ligation of the posterior tibial artery or partial resection of the artery did not change the index of blood supply, which was only from 5 to 10 per cent lower than normal. Cutting through the posterior tibial artery and the peroneal artery caused a decrease in pressure in the vessels of the flap. The method of osteoplastic treatment, according to Abraschanow, consists in taking the flap from the flexor surface of the knee. As compared to the normal blood supply, the index is diminished from 10 to 15 per cent. The index, using Gritti's or Sabanejew's technic, is irregular and considerably lower. The Bier flap, taken from the anterior inner surface of the leg, contains the most vessels at the site of the plate of bone, in the rest of the flap the index is considerably lowered.

Ritter (Zentralbl f Chir 56 2565 (Oct 12) 1929) after covering the end of bone with strips of fascia, in amputation through the femur noted when

the patient returned about a year and a half later, because of painful exostoses at the end of the stump, that the fascia had been converted into a hard, firm sheet or plate which effectively covered the end of the stump. Overlying this plate was a layer of tissue resembling periosteum.

**AMYLOIDOSIS.**—The substance amyloid is a protein body deposited primarily under the endothelial lining of blood-vessels. H. Waldenström (Acta chir Scandinav 63 479, 1928) postulates some derangement of ferments which normally convert amino-acids into proper body proteins so that an insoluble, unreactive protein is formed. Modern chemistry teaches reversibility in most chemical reactions, and if this is true of amyloid, some cures occur provided, of course, the original cause of the deposition of amyloid (chronic suppuration) is removed. Reported cases are, however, quite rare. G. F. Walker's (Lancet 2 120 (July 21) 1928) case in a 4 year old child is not, of course, proved, but it seems likely that the condition was present. The liver and spleen became much enlarged following prolonged post-pneumonic empyema. A thoracoplasty cured the empyema and 8 years later examination failed to find enlargement of the liver and spleen.

Renal insufficiency is not infrequently the cause of death in amyloid disease. As more and more of the kidneys are replaced by amyloid, their function gradually diminishes. Large amounts of albumin are continuously secreted, *e g*, in one patient practically every sample of urine examined over a period of 5 years, boiled solid. All sorts of casts, in-



cluding amyloid casts are found Hypertension is absent as a rule Clinically, it is wise to bear this condition in mind when prolonged attempts are made to save injured limbs with osteomyelitis, etc, by various ingenious operative measures It is better to sacrifice a part than to have the patient die of amyloid disease

**DIAGNOSIS**—A clinical test for the diagnosis of amyloidosis, according to M Nathan (Munchen med Wchnschr 75 1883 (Nov 2) 1928) is as follows A saturated solution of fine congo red is made in distilled water The solution is boiled, filtered aseptically and placed in ampules of transparent glass so that any solid particles can be detected Three or 4 c c of blood are drawn from a vein in the elbow into a centrifuge tube An equal quantity of congo red solution is then injected intravenously One hour later, a sample of blood is withdrawn from another vein into a centrifuge tube The next day the color of the serum in the centrifuge tubes is compared If the second sample contains congo red, its color is distinctly red compared to the first sample A drop of hydrochloric acid settles any question as to hemoglobin, which turns brown The congo red becomes blue Since amyloid absorbs congo red, if the second sample of blood retains the color, amyloidosis is not present This test was borne out negatively by 9 patients, positively in 2 and doubtful in 1

**ANAPHYLAXIS.—DEFINITION**—Although anaphylaxis and allergy are considered forms of hypersensitivity in both the human and

the experimental animal, each with varying manifestations, the distinction should be drawn at the outset Anaphylaxis is believed to be an expression of the hypersensitiveness of an individual produced artificially by the inoculation, while the term allergy denotes the natural hypersensitiveness of an individual which results in serious manifestations following the contact with some offending substance for the first time

**REACTIONS**—R W Lamson (J A M A 93 1775 (Dec 7) 1929) reports the case of a man of 34 who was a pollen-sensitive patient having received 14 injections of increasing concentration of Bermuda grass pollen extract before the following injection which happened to be one-half the amount of the preceding injection This injection resulted in death in from 3 to 5 minutes as a result of an asthmatic syndrome in spite of drastic methods of stimulation instituted immediately

Another case reported by Lamson was that of a man aged 34 years who was having a series of intradermal tests, and 2 or 3 minutes following the last one complained of lacrimation and a burning sensation in the chest Adrenalin was administered but cyanosis and respiratory difficulty became extreme and death ensued within 5 minutes

A third case reported by the same observer was a youth aged 15 years who, following a "street accident," was given 1500 units of tetanus antitoxin into the lumbar muscles As he was being assisted from the physician's office, he exclaimed "What's happening" He slumped into the physician's arms and died almost instantly No dyspnea, cyanosis, pal-

lor, urticaria, angioneurotic edema or asthmatic syndrome preceded death

Many cases commonly classified as "fatal anaphylaxis" should not be so enumerated. It immediately places the suspicion of improper desensitization of the patient upon the physician.

Blankenhorn (J A M A 85 325 (Aug 1) 1925) and L Tuft (Am J M Sc 175 325 (March) 1928) emphasize the ineffectiveness of the Besredka desensitization technic in their cases. The first case cited showed definite relief from a series of injections of pollen until the last dose, following which he had a fatal reaction. Previous injections failed to protect him against a minute dose of the material. Thus we see the reaction of the injected substance had little relation to the fatal result.

Even many non-specific factors such as inspiration of cold air, nervous or physical strain, irritation of the respiratory tract by sulphur dioxide may initiate a group of symptoms similar to those described above. The temperature of a drink of water was the deciding factor in 1 patient's case. Such a thing immediately instituted an attack of wheezing quickly to be relieved by a drink of hot water.

Lamson (*loc cit*) decries the grouping of these cases under the classification and limitation of fatal anaphylaxis as it tends to prevent further observations and stifles research work. Such classification leads to incorrect treatment, and for many years these unfortunate accidents were grouped as "status lymphaticus."

L Bohmig (Med Klin 24 1269 (Aug 17) 1928) describes an Herxheimer reaction in a congenital luetic patient which as study revealed was

not identical with the reaction seen in secondary lues. After the first dose of mercury, the patient had a rise in temperature, morbilliform exanthemata and eosinophilia with immature neutrophils. Continuation of the treatment resulted in reduction of the size of the splenic tumor, increase in the eosinophilia, an increase in the lymphocytes and a disappearance of the immature neutrophils. When treatment was suspended there was a falling off of the eosinophilia with further increase in the lymphocytosis. Bohmig believes this case may be explained purely on the basis of anaphylaxis in view of the fact that this luetic had not received any specific treatment for 18 years. He was therefore saturated with endotoxins and was susceptible to the toxins liberated in large quantities by the renewed specific medication.

**PROPHYLAXIS**—In addition to the general measures of stimulation instituted immediately following the anaphylactic shock, H Gougeiot, E Peyre and Bertillon (Ann d mal ven 24 81 (Feb) 1929) advocate as a prophylactic measure against shock in arsenotherapy, the dissolving of 5 to 20 c c ( $1\frac{1}{4}$  to 5 drams) of a 10 per cent solution of cerium eosinate in the arsenical immediately preceding its administration. In the treatment of the *shock*, they use 5 to 10 c c ( $1\frac{1}{4}$  to 5 drams) of the same solution intravenously. Forty-seven out of 50 cases showed good results. They believe the benefit is in its ability to inhibit blood flocculation.

**ANEMIA IN CHILDREN.—**  
**PERNICIOUS ANEMIA**—C H Watkins (J A. M. A. 93 1365 (Nov 2) 1929) recognizes a form of

secondary anemia found only in young persons whose parents or other near relatives have had pernicious anemia. The erythrocyte count is slightly and the hemoglobin is moderately reduced, so that the color index is less than 1. There is a moderate hypochromasia and anochromasia of erythrocytes. There is generally slight anisocytosis with some macrocytosis. The most characteristic feature of the blood-picture is the morphology of the neutrophils. The number of lobes of the neutrophilic nucleus is increased and there is a tendency toward definite thinning and stranding of the individual lobes as in the true pernicious anemia neutrophil. Such a condition has been called the potential pernicious anemia type of secondary anemia. These patients, as might be expected, respond well to liver or liver extract therapy.

The existence of primary anemia (pernicious anemia) in children has been, up until the present time, regarded with a great deal of doubt. There is no authentic case of primary anemia on record in which death occurred at an age of less than  $4\frac{1}{2}$  years (H. K. Faber, *Am J Dis Child* 36 1121 (Dec) 1928). It does not follow, however, that the disease may not occur at an earlier age. In addition to the blood picture, the diagnosis should be based on the presence of achlorhydria, and one or more of the other characteristic symptoms. In diagnosing cases occurring in infancy and in early childhood reported in the past, ordinary blood and post-mortem studies have been relied upon. Consequently, all cases in which necropsy was not performed, must be rejected as unproved.

Nevertheless, cases have been reported in the first year of life in which the blood picture closely resembled that of pernicious anemia. This suggests either that the infants were suffering from pernicious anemia or else from some pathologic process which had as a common feature with the latter the defective erythroblastic maturation in the bone-marrow which F. W. Peabody (*Am J Path* 3 179 (May) 1927) described as occurring so constantly in pernicious anemia.

Faber put this hypothesis to the therapeutic test in the case of 2 infants under 1 year of age suffering from an anemia resembling the primary type. Striking clinical and hematologic improvement, associated with the characteristic transient rise in circulating reticulocytes, closely followed the administration of liver extract. In 1 of the infants, a concurrent achlohydria was present. However, one should not lose sight of the fact that the reticulocyte response to liver therapy is not pathognomonic of primary or pernicious anemia. An increase in the number of circulating reticulocytes, accompanied by clinical improvement occurs when liver therapy is used in secondary anemia due to hemorrhage (S. C. Dyke, *Lancet*, 1 1192 (June 8 1929)).

**APLASTIC ANEMIA** of unknown origin and of progressive and fatal evolution has been considered by some authorities as a variety of pernicious anemia. These 2 diseases, however, should be differentiated from each other (J. Orrico, *Arch latino-am de pediat* 23 125 (Mar) 1929). Aplastic anemia should be diagnosed only when aplasia of the marrow is present and hemolytic

phenomena are absent Orrico described 2 instances occurring in children about 2 years of age. Examination of the bone-marrow confirmed the diagnosis H Brooker Mills, M G Wohl and S Goldberg, (Amer J Dis Child 38 219 (July) 1929) reported a case of aplastic anemia in a boy 7½ years of age which developed soon after an infection of the finger

#### GOAT'S MILK ANEMIA.—

Again it may be emphasized that the blood picture of goat's milk anemia tends to resemble that of pernicious anemia (P Barbacci, Riv di clin pediat 26 489 (July) 1928), (C M Hyland, Arch Pediat 46 673, 1929) It is interesting to note that 1 of Faber's patients who had a blood picture of primary anemia had received goat's milk It has been suggested that the stimulus which produces this type of anemia lies in the high molecular fatty acids which goat's milk contains

**SPLENIC ANEMIA**, of the type often associated with the name of Banti, is a condition or group of conditions, the pathogenesis of which is still obscure In the original description, it is obvious that the term was employed to include a number of specific conditions which have since been recognized as separate entities The splenomegalies of Gaucher and Niemann, for example, may be mentioned in this connection (W H Evans, Lancet 1 277 (Feb, 9) 1929) Splenic anemia (Banti) in infants and children is uncommon G Ruelle (Bruxelles-méd 8 949 (May 20) 1928) related an instance of it in an infant of 4 years of age and J. W Bruce (Kentucky M J 27 423 (Sept) 1929), another in a child

#### VON JAKSCH'S ANEMIA.—

(Anemia infantum pseudo-leukemia) R G Karshner (Am J Roentgenol 20 433 (Nov) 1928) stated that in von Jaksch's anemia there is a decided thickening of the medullary portion of the cranial bones Early the bone-marrow is mottled and spongy, later striations of new bone, perpendicular to the tables, appear The pelvis, spine, scapula and bones of the hands and feet are very porous, the metacarpals are expanded and the cortex of the long bones is quite thin and the medulla unusually transparent Von Jaksch's own description of this type of anemia did not sufficiently identify any particular clinical entity, so that many secondary anemias have been included under this classification T B Cooley (Am J Dis Child 33 786 (May) 1927) believed that the existence of a characteristic anemia, essentially connected with either rickets or syphilis has not been proved However, C J Watson (Arch Path 8 224 (Aug) 1929) has demonstrated that extensive destruction of the blood may occur in the spleen in congenital syphilis and is probably an important factor in the production of anemia A marked erythrophagocytosis and hemosiderosis was given as the evidence of destruction

Cooley would have the term *Von Jaksch's anemia* discarded and would designate the condition *erythroblastic anemia of childhood*, basing this new term upon striking and characteristic increase in number of erythroblasts which circulate in the blood, especially after splenectomy. According to this student of anemia, congenital hemolytic icterus, sickle-cell anemia, and erythroblastic anemia (Von

Jaksch's anemia) apparently are rather closely related, not only in symptomatology but also in fundamental etiology. The first 2 diseases are definitely hereditary and familial.

It is interesting to note that sickle-cell anemia is not, as was once believed, entirely limited to the colored race. T B Cooley and P Lee, (*Am J Dis Child* 38 103 (July) 1929) report a case of sickle-cell anemia in a Greek boy of 4 years of age. Unquestionable sickle-cells, in small numbers, have also been observed in certain members of the white race (J S Lawrence, *J Clin Investigation* 5 31 (Dec) 1927).

#### ANEMIA IN THE NEW-BORN.

—The cause of anemia in the newborn infant is unknown. The condition is uncommon, only 6 such cases having been reported. In 1 related by E W Ehrmann (*Am J Dis Child* 37 138 (Jan) 1929) regenerative changes, such as nucleated red cells, polychromatophilia and high white cell count, accompanied degenerative changes, such as anisocytosis and moderate achromia. Poikilocytosis was not marked. It was thought that the increased fragility of the red cells suggested an inherent weakness of the cells themselves, a condition not seen in pernicious anemia.

**NUTRITIONAL ANEMIA** — L W Hill (*New England J Med* 20 261 (Aug 8) 1929) defined nutritional anemia in infants as a "secondary disease, occurring usually between the ages of 6 months and 2 years, dependent, probably, upon errors of nutrition." This type of anemia was considered by him to be a definite deficiency disease, comparable to rickets and scurvy, dependent upon a lack of iron and pos-

sibly pigment in the diet. Experimental evidence seemed to show that growth was necessary to its production. Nutritional anemia is analogous to rickets in that the more rapid the growth the more rapid is the development of the anemia.

Clinically, pallor and occasionally icterus of the skin is present. The liver and spleen, as a rule, are not enlarged. The weight of the child may be normal. The blood picture is characteristic. The hemoglobin is reduced usually more than the red cells. These cells show considerable achromia, but little variation in shape and size. Nucleated red cells, stippling and polychromatophilia are uncommon, and the severity of nutritional anemia seems to vary with climate. Helen M MacKay (*Proc. Roy Soc Med (Sect Dis Child)* 22 29 (Feb) 1929) has found nutritional anemia to be very common in London. She examined 770 fairly healthy, artificially-fed infants. The average hemoglobin percentage fell from its high level at birth to 65 per cent at 2 to 3 months of age, rose to 70 per cent at 5 to 6 months and then steadily fell, reaching 65 per cent at the age of 1 year. P Drucker (*Acta Paediat* 3 1, 1923) asserted that in Copenhagen the hemoglobin percentage remained about 80 per cent for healthy infants of from 2 to 12 months of age. V B Appleton's (*Jour Biol Chem* 34 369, 1918) averages in America were about 88 per cent for healthy infants from 3 to 11 months of age. The figures given in some instances may be considered as normal ones by some pediatricians and some of the variation is undoubtedly due to the personal equation of the observers and to dif-

ference in method of estimating the hemoglobin percentage

**GAUCHER'S DISEASE.**—A O Whipple, R J Reeves and C C Cobb (Ann Surg 88 380, 1928) described their studies on 2 children in whom splenomegaly, anemia and jaundice were accompanied by peculiar bone changes and atypical cells of the Gaucher type in the spleen. The inner and outer tables of the skull showed thinning, accompanied by great thickening of the diploe. The long bones presented a streaked appearance due to transverse lines of calcium occurring in generally decalcified bones. The spleen showed fibrosis and peculiar vacuolated cells of the Gaucher type scattered in the splenic pulp. H Hampeil (Virchow's Arch f path-Anat 271 147, 1929) related an instance in which the Gaucher cells were found not only in the spleen, liver, lymph nodes and bone-marrow, but also in the cortex of the thymus, the tonsils, adenoids, lymph follicles of the intestines, zona reticularis of the suprarenal glands and apparently in the lungs.

**TRICHOCEPHALUS ANEMIA** is described by Bosio (Riv di clin pediat 27 33 (Jan) 1929) in a breast-fed infant who presented only an anemia syndrome. The anemia was believed to be due to the effect of helminthic toxins eliminated in the breast milk.

**DIAGNOSIS OF ANEMIA — Palm Test**—W W Duke (Arch Int Med 42 533 (Oct) 1928) asserted that the color of the palms is influenced by few conditions except anemia and plethora, and that from a comparison of the patient's palm with that of a normal person slight deviations from the optimum in the

quantity of hemoglobin in the general circulation could be demonstrated. In making this test both the patient and the normal person should be in the same position, either standing or sitting. The hand of each should be semiflexed and should be held at about the level of the apex of the heart, until a constant color has been established.

**TREATMENT**—So startling were the early results obtained by the liver treatment of pernicious anemia, and so relatively slight the results in secondary anemia, that there was a natural tendency to deny any usefulness to this form of therapy in the treatment of forms of anemia other than the primary type. Several factors make it difficult to determine the efficacy of liver therapy in secondary anemia. Secondary anemia is not an entity but rather a term applied to a heterogeneous group of anemias and consequently uniform results cannot be expected in all cases. Again, the results obtained by liver treatment are often confused by the natural tendency of the tissues to recover, and also by the persistence or withdrawal of the primary cause of the condition (S C Dyke, Lancet 1 1192 (June 8) 1929).

J P Crozer Griffith and J P Scott (M J and Rec 128 121 (Aug 1) 1928) found that liver therapy in the severe cases of anemia in early life may fail completely, they also doubted whether in the milder cases it had any advantage over the administration of inorganic iron. When the condition of the child is one which permits the rebuilding of hemoglobin through the administration of iron, it is probable that iron in any form will be of value.

I Ligum (Monatschr f Kinderh. 43 513, 1929) obtained beneficial results with **liver therapy** in the treatment of anemia in infants and young children. However, the diet often caused indigestion and diarrhea, the younger the child, the more likely were the digestive disturbances to develop. He believed that in the simple form of anemia, treatment with **iron** is just as effective as liver therapy.

L Hill (*loc cit*) employed both **inorganic iron** (reduced iron, 0.13 Gm (2 grains) a day) and **liver** in the treatment of a series of cases of nutritional anemia. The raw liver was prepared by grinding it so fine that a paste could be made. From 2 to 4 teaspoonfuls of this preparation was given each day. Hill found that inorganic iron alone would, in some cases, bring about satisfactory results, again liver alone was efficient in some cases. However, the most rapid hemoglobin synthesis was produced by the use of liver and iron together. C S Keefe and C S Yang (J A M A 93 575 (Aug 24) 1929) came to the same general conclusions in cases of secondary anemia treated with liver and iron.

Faber, as previously noted, obtained striking clinical and hematologic improvement with **liver extract** in the treatment of infants with a blood picture resembling that of a primary anemia.

J Waddell, C A Elvehjem, H Steenbock and E Hart (J Biol Chem 77 769 and 777 (May) 1928) have demonstrated that highly purified inorganic iron salts fail to increase materially the hemoglobin level in experimental and nutritional anemia in laboratory animals. How-

ever, when copper containing foods, such as liver, lettuce, yellow corn, and the like, or the ash residue of these food substances are given, improvement occurs. Subsequently, it was found that a trace of **copper** supplied along with the **iron salts** eliminated the anemia hazard from the experimental milk and bread diets. It is interesting to note that copper is found normally in blood (J S McHargue, Am J Physiol 72 583 (May) 1925). Recently E S Mills (Canad M A J. 22 175 (Feb) 1930) obtained excellent results by treating a number of adults, suffering from idiopathic secondary anemia, with **iron and copper**, or **iron and calf's liver**. These patients showed no improvement when treated with iron alone. Thus copper appears to be a factor in the building of hemoglobin. Nor does copper seem to be the only metal complementing the effect of iron in the treatment of secondary anemia. V C Myer and H H Beard (J A M A 93 1210 (Oct 19) 1929) discovered that experimental nutritional anemia in rats can be corrected by adding a trace of **manganese**, **nickel**, **germanium** or **arsenic** as well as **copper** along with 0.5 mg ( $\frac{1}{130}$  grain) of iron to the daily diet.

The beneficial effects of **liver therapy** in the treatment of primary anemia, however, does not depend upon the copper content of the liver preparation. The hemopoietic stimulant of liver so beneficial in cases of primary anemia is thought to be an integral part of the cell nucleus (N W Jones, B I Phillips, Larsell, O, and H T Nokes, J Ann Int Med, 2 603 (Jan) 1929).

**Iron in Anemia**—In experimental, nutritional anemia in rats, the ferric

compounds are as a rule better utilized than the ferrous (Helen S Mitchell and Marjorie Vaughn, J Biol Chem 75 123 (Oct) 1927) A grouping of iron salts, based upon the rapidity and height of hemoglobin response, may be classified as follows *good* ferric acetate, ferric albuminate, ferric chloride and ferric citrate, *fair* peptonized ferric oxide, saccharated ferric oxide, saccharated ferrous carbonate, and ferrous iodide, *poor* ferric oxide, ferrous carbonate, ferric potassium tartrate, reduced iron and ferrous sulphate

**Splenectomy**—Splenectomy in erythroblastic anemia (Von Jaksch's anemia) is followed by marked increase in the erythroblasts of the blood but there seems to be little definite improvement in the patient Splenectomy in hemolytic jaundice is virtually a complete cure In sickle-cell anemia, however, the removal of the spleen is followed by no pronounced immediate reaction Normoblasts tend to disappear, while at the same time, reticulation may be increased The patient seems improved, the anemia, at least temporarily, is less pronounced, but hemolysis still persists and sickling is unchanged (Cooley, T B, Am Jour Dis Child 36 1257 (Dec) 1928) However, J F Landon and A V Lyman (Am J M Sc 178 223 (Aug) 1929) report the seventh case of splenectomy for sickle-cell anemia, in which the clinical condition, 14 months after operation was greatly improved, although the sickle-cell characteristic was not abolished The size of the spleen may be a factor, it was thought that the marked enlargement of the spleen which had been present in this patient may have

had some bearing on the unusual degree of improvement

**Splenectomy** is the accepted treatment for splenic anemia, although T G Moorhead (M Presse 127 384 (May 8) 1929) believed that the value of the operation has been overestimated and it is not without danger in certain cases

**ANEMIA, PERNICIOUS.—ETIOLOGY**—Recently the majority of opinion as to the etiology of pernicious anemia has pointed to some morbid process within the *gastro-intestinal* tract S Davidson (Brit. M J 2 1123 (Dec 22) 1928) reports a case of duodenal ulcer with operation following perforation, treated with liver and alkalis which made a very satisfactory recovery

The same author (Lancet 2 961 (Nov 5) 1927) reports the many futile attempts to discover some unknown organism in the intestinal flora responsible for the development of pernicious anemia He believes that such a thing does not exist, but that the entire number of various organisms is markedly increased and again that this is most pronounced in the case of *B welchii* In addition he believes there is a breakdown of the liver in its detoxifying function resulting in intoxication of the entire system and the rapid destruction of immature erythrocytes

A Cederburg (Berl Klin Wchnschr 51 585, 1914) considers pernicious anemia the result of *gastro-intestinal* disturbance allowing the absorption of undigested proteins or hemolytic toxin produced in the process of intestinal putrefaction

G R Minot (Oxford Medicine, vol -2, Part II, p 612) remarks that



equally favorable results following the administration of the water soluble non-protein fraction of the *liver* as well as liver itself indicate very strongly that there is a disturbance of the hormonal mechanism of the organ

As pointed out by A. Engel and G. Olin (*Acta med Scandinav* 70 150 (Feb 28) 1929), several men have reported the association of pernicious anemia with *intestinal stricture* and pathological changes all along the intestinal tract. *B. coli* and organisms never found normally in the stomach, duodenum or jejunum, have frequently been found in cases of achlorhydria and almost constantly in cases of pernicious anemia.

Contrary to this view, S. Harris (*South M J* 21 137 (Feb) 1928) expresses the opinion that no one organism is causative for primary anemia, but that many varied types may cause a hepatitis and biliary tract disease resulting in a diminution or elimination of the hormone known as *antihemolysin*, resulting in a rapid and progressive destruction of immature erythrocytes. The *achylia gastrica* may result from a common infection of the stomach and liver which precedes the disease or may antedate it several years, resulting in a loss of antiseptic efficiency of the gastric juice, permitting the entrance of pathogenic bacteria into the biliary tract. The fact that **liver therapy** relieves the symptoms by inducing a return to normal of the blood count, but has no effect upon the complicating symptoms, reveals that the cord changes are probably not directly related to the anemia but are the result of inflammatory processes similar to those affecting the digestive tract.

**SYMPTOMS.**—These develop insidiously and vary in order of appearance. Muscular weakness, dyspnea and pallor are frequently first to show themselves. At times gastro-intestinal disturbances or nervous phenomena manifest themselves early. The skin has a lemon yellow tint rather than a dead white. During a recurrence, the temperature may rise to 100° or 102° F (37.8° or 38.9° C). The basal metabolic rate is usually well above normal. The feces contain an abnormal amount of urobilin and urobilinogen. Enlargement of the spleen and liver is frequently present. The nervous phenomena may consist of weakness and tingling of the extremities but usually progress to a posterior sclerosis, then a lateral sclerosis and, finally, a combined sclerosis. The blood shows marked deviations from the normal, particularly the red cell count, where reports of 500,000 to 200,000 are common. The hemoglobin is usually relatively high giving a color index above 1.0. Anisocytosis, poikilocytosis and polychromatophilia are present. Normoblasts are usually in abundance and the leukocyte count is frequently below 5000.

**DIAGNOSIS.**—F. C. Eve (*Lancet* 1 1070 (May 26) 1928) has evolved a method for accurately determining the diameter of the erythrocytes, a most constant feature in pernicious anemia. He uses the Thornton-Pickard reflex camera. It is extended at full length and brought within 2 feet to focus the filament of a focus lamp. A thin blood smear is placed before the lens and the image of the lamp is surrounded by 2 concentric colored halos. Their diameters in

normal blood are 32 and 65 mms measuring the outer edge of the inner halo. In pernicious anemia, the halos are smaller (25 to 29 mms), hazy edged, and usually badly colored. This is because the red cells are larger and irregular shaped and of such a size that the resulting halos and colors overlap. Normal red cells, being round and equal, cause surprisingly efficient "interference" (alternate reinforcement and cancelling) of the light waves. The halos are easily photographed but are best measured by the eye. A normal blood film held up to a bright light shows a play of iridescent colors which are not seen in advanced anemia.

A Serra (Am J Trop Med 9 49 (Jan) 1929) concludes that *sprue* and pernicious anemia are 2 separate and distinct diseases. Examination of the gastric contents is probably the best differential point, but in addition there is emaciation, a small liver and lack of utilization of fat in *sprue*, while fever, achlorhydria and spinal cord changes predominate in the picture of pernicious anemia. Nitrogen retention is common in pernicious anemia and generally absent in *sprue*. The bilirubin content of the blood is much higher in pernicious anemia as also is the color index. Nucleated red cells are rare in *sprue* while poikilocytosis, anisocytosis and polychromatophilia are much more pronounced in pernicious anemia. In general the blood picture of *sprue* is more aplastic in type.

T Naegeli (Bolesni Organov Pish-tevarenia 4 1, 1928) believes pernicious anemia may lie dormant for years waiting for a final factor, which he considers is frequently pregnancy.

In *sprue* he has never found megalocytes but a marked microcytosis. According to this author, megaloblasts with finely reticular nuclei, and old megaloblasts with small nuclei or a few nuclear fragments, are never found in any other type of anemia than pernicious.

H H Morris (China M J 43 768 (Aug) 1929), reporting on the difficulty of differential diagnosis between *sprue* and pernicious anemia, states that both diseases are comparatively rare in the Chinese race. This he believes may be the result of their diet.

**COMPLICATIONS**—L H Hitzrot (Am J M Sc 177 213 (Feb) 1929) reports 6 cases of *diabetes* associated with pernicious anemia. Another case which he himself reported gave evidence that the diabetes antedated the anemia by several months. Following a complete remission of the anemia with a Minot-Murphy diet the diabetes appeared several weeks later. So far the small number of cases warrants the opinion that these were only a coincidence and not an association of the 2 conditions.

According to D McAlpine (Lancet 2 643 (Sept 28) 1929), mental changes occur not uncommonly in pernicious anemia ranging from states of depression accompanied by a loss of mental energy to definite *psychoses*. These cases showing abolition of deep reflexes are naturally the least favorable.

P E Weil and R Cohen (Presse méd 36 945 (July 28) 1928) state the nervous phenomena may even dominate the clinical picture. For this reason many cases considered "*neurasthenia*" would prove otherwise following a complete blood examination. Previous to liver therapy, the prognosis was bad, but now the disturbances

disappear slowly, but completely and permanently.

**TREATMENT**—Since the introduction of liver as a modern advance in the therapy of pernicious anemia by G R Minot and W P Murphy in 1926, the literature has been overwhelmed by the innumerable articles and reports of investigators from all over the world

These writers (Brit M J 2 674 (Oct 15) 1927) believe the beneficial effect of liver is the result of the stimulation of the maturation of the megaloblasts that crowd the bone marrow during remissions, resulting in a decided increase in the reticulocyte count which is inversely proportional to the red cell count They also believe the dysfunction of the hemoglobin metabolism is a secondary phenomenon and that the anemia is due to a defect in the manufacturing of erythrocytes rather than a hemolytic process

The advantageous point or factor in the use of liver is the adaptability of its preparation to each individual taste It may be prepared in innumerable ways provided it is not exposed to long boiling The amounts necessary for the elevation of the erythrocyte count and maintenance at a figure of 4,500,000 to 5,000,000 may vary from 50 to 300 Gm ( $1\frac{2}{3}$  to 10 ounces) per day In addition to the liver which may be obtained from all domestic animals, the diet should be rich in fruit, green vegetables and red meat Excess of fat causes indigestion and unnecessary gain in weight Sweet and starchy foods, especially soggy ones, should be avoided

**EFFECT OF LIVER THERAPY**—T Lind (Munchen med Wchnschr

75 635 (Apr 13) 1928) noted a considerable diminution in the number of macrocytes following liver therapy in all his 13 cases The decrease was not as great as noted by American observers

P A Heeres (Nederl Tijdschr v Geneesk 1.2372 (May 12) 1928) reports the reappearance after 9 months of free hydrochloric acid of 25 with total acidity of 55 The erythrocytes increased from 920,000 to 3,580,000 and the hemoglobin from 17 to 80 per cent This is probably so far the only case of its type on record

Minot and Murphy (*loc cit*) report the elevation of the red cell count by a million per week in responsive cases to the point of a count of 5,000,000 They stress particularly the importance of constant and sustained liver feeding in one of its several forms

Confirmation of the opinion of the pioneers in the subject of liver therapy for pernicious anemia has been made by several workers Results have been compiled by Seyfarth, Morawitz, Mills, Richardson and Schilling

**Liver Extract**—The inability of the physician to constantly persuade his patient to use whole liver over long periods of time, no matter in what form offered, led to an enormous amount of work to determine some extract or active principle which would be useful in small doses and have the desired effect To this end, Cohen, working with Minot and Murphy, began in 1927 the important work of isolating this principle or extract Soon he produced such an extract and in the absence or inability of the physicians to produce pernicious anemia in laboratory animals, the preparation was used upon human

patients The results were so gratifying that in May of the same year, the Committee on Pernicious Anemia of the Harvard Medical School was organized to devise a plan for its production on a large scale The services of the Eli Lilly Company were accepted, and from this time on large quantities of the extract have been produced, thereby making possible the use of as little as one-fiftieth of the total quantity of whole liver formerly used in the treatment of a case

Following this work, W B Porter, J P Williams, J C Forbes and H Irving (J A M A (July 20) 1929) have developed another aqueous extract of liver which they claim remains constant when subjected to conditions common to the therapeutic material in ordinary use They stress the repeated reticulocyte count as of extreme value in determining the potency of the extract

**MAMMALIAN STOMACH**—C C Sturgis and R Isaacs (J A M A 93 747 (Sept 7) 1929) quoting W B Castle (Brit M J 1 1120 (1929)), state that the latter found a substance secreted by the stomach of normal individuals which would develop a blood maturing principle from meat Observations conducted in conjunction with Dr E A Sharp, were made on the theory that feeding of desiccated stomach should have an effect similar to liver in cases of pernicious anemia

With the removal of fat from the prepared material made from swine stomach, an extract was obtained in which 30 Gm (1 ounce) represented 218 Gm (7 ounces) of the fresh tissue. This product had very little odor or taste and daily feedings of 15 to 30 Gm ( $\frac{1}{2}$  to 1 ounce) of this

extract were made to 3 cases of primary anemia with most gratifying results in their response to reticulocyte formation

Experiments are at present being conducted to determine the origin of this hemopoietic stimulating substance as to its exact location and mode or manner of activity One theory is advanced that some enzymatic action on the gastric mucosa from the time the animal is killed to the production of the desiccated extract accounts for its activity Another is that the gastric mucosa may normally contain the substance responsible for this hemopoietic activity

**ANEMIA, SECONDARY — TYPES**—Chronic secondary anemia is divided into 3 groups or types by C H Watkins (J A M A 93 1365 (Nov 2) 1929) (1) Hemorrhagic, (2) a type due to definite organic lesions and (3) idiopathic type The latter is believed by him to be the most resistant to treatment due to its unknown etiology A list of the characteristic features of regeneration and degeneration is of value in a study of such obscure cases of anemia Of the regenerative features, we must enumerate the following (1) anisocytosis, (2) polychromatophilia, (3) reticulocytosis, (4) normoblasts, (5) multiple Howell-Jolly bodies A consideration of the degenerative features leads to a list of the following (1) poikilocytosis, (2) hypochromasia (pale cells) and (3) anochromasia (ring form of hemoglobin)

According to Watkins, chronic idiopathic secondary anemia may be subdivided into 4 general types according to the morphology of the blood picture.

(1) The first type usually occurs in young females. The hemoglobin usually is 50 to 55 per cent ; R B C , 4,000,000 , color index, 0.5 to 0.6. The erythrocytes show marked anochromasia, moderate anisocytosis, slight hypochromasia and slight polychromatophilia. The marked anochromasia is the outstanding feature, and this type is believed due to dietary deficiency and improper hygiene the correction of which usually insures a rapid improvement.

(2) The second type reveals a color index of 1.0 as the hemoglobin and erythrocyte count are reduced proportionately. The most characteristic change is in the leukocytes where we see a nucleus containing 4 or 5 lobes. The blood picture here is slightly suggestive of a predisposition of the patient to faulty bone marrow function. This type has frequently been termed a "semiaplastic" type of anemia. Treatment is directed toward the stimulation of the bone marrow by transfusion, intramuscular injection of whole blood and the use of experimental extract of bone marrow.

(3) The third type occurs in women between the ages of 35 and 50 years. The hemoglobin is reduced to 45 to 50 per cent , whereas the red cell count remains high. The outstanding feature is the marked hypochromasia of the erythrocytes. Here the dysfunction is apparently in the synthesis of the bone marrow as it is quite active. The use of fetal calves' liver in large doses has been of marked value.

(4) The fourth type is found in young persons whose relatives or parents have had pernicious anemia. The color index is less than 1.0 and

the characteristic change is in the neutrophilic nucleus when 5 to 7 lobes are found with a thinning and stranding of the individual lobes. In the treatment of these cases liver has been most gratifying.

**ANEMIA OF PREGNANCY** — W Allan (South M J 22 624 (July) 1929) states that a hemolytic anemia of pregnancy occurs chiefly in women under 30 years and runs an acute course without remission. Frequently the presence of fever and leukocytosis leads to an incorrect diagnosis of puerperal sepsis and improper treatment. Many of these patients present themselves when the anemia has developed to severe proportions. In some instances a therapeutic abortion is necessary.

Etiologically many believe this form of anemia, which is quite similar to the primary pernicious form, is the result of a toxic agent derived from the pregnant uterus. This theory is favored by the fact that many cases show complete recovery following delivery while others continue to grow progressively worse. Many cases are complicated by infections in addition to the sepsis of pregnancy.

In many instances, the picture of the anemia of pregnancy and chronic pernicious anemia is so identical that a differentiation is practically impossible. Both are considered deficiency diseases in which liver feeding will hold the symptoms in abeyance without removing the cause in the case of pernicious anemia.

Liver therapy in pernicious anemia results in a resumption of the erythrocyte formation, but in the anemia of pregnancy the effect of its use or that of blood transfusion is the same, and in addition there is a peculiar

effect on the hemolysis of blood cells which is reduced as evidenced by the fall in the icteric index with the disappearance of the urobilinogen from the urine

R Peterson, H Field, Jr and H S Morgan (J A M A 94 839 (Mar 22) 1930) report 3 cases of severe anemia of pregnancy. They point out the fact that this can be differentiated from true pernicious anemia by (1) the scarcity of macrocytes, (2) the presence of free hydrochloric acid in the stomach and (3) the absence of remissions. A similar response to liver therapy either as fresh liver or as liver extract occurred.

**TREATMENT**—Of greatest importance and advancement in recent years in the treatment of anemia has been the work of Minot and Murphy on the use of fresh liver and extracts made therefrom. Their work has been repeated and confirmed by numerous observers and more recently liver has been found of value in treating cases of secondary anemia.

S C Dyke (Lancet 1 1192 (June 8) 1929) is of the opinion that liver is of greatest value in those cases due to failure of the blood regeneration following *hemorrhage* and is markedly enhanced by the use of iron.

Following a series of cases studied by J Vaughan (Lancet 1 1063 (May 26) 1928), he divides anemia into 3 classes: (1) the pernicious type, (2) anemia secondary to hemorrhage and (3) anemias associated with definite blood diseases or with carcinoma or idiopathic anemia. He concludes by stating that liver or the extract or both were valuable in the treatment of all cases, except those of carcinoma and leukemia. Special significance is given to the use of liver and its

extreme value in those cases of unknown etiology.

Studying the effect of liver on the secondary anemia of *pulmonary tuberculosis*, H F Newton (Klin Wchnschr 7 1062 (May 27) 1928) found these cases of severe *pulmonary hemorrhage* responded best to liver therapy. It also resulted in an improvement in the appetite and also the weight of the individual. In 8 days he reports a definite increase in the red cell count. Arsenic, iron, repeated transfusions had been of little avail. He also noted a retrogression of the leukocyte count in these cases.

V Coates and J L Delicati (Lancet 1 1069 (May 26) 1928) report a moderate number of cases of *infective arthritis* suffering from varying degrees of secondary anemia. The response to liver therapy was gratifying in the majority of these cases and it was further noted that there was a retrogression of the leukocytosis with a beginning predominance of the neutrophilic leukocytes.

C S Keefer and C S Yang (J A M A 93 575 (Aug 24) 1929) report the combined use of liver and iron in the treatment of secondary anemias. Their work was stimulated by the experimental work of Robschey-Robbins and Whipple. The series studied by Keefer and Yang consisted of 37 patients suffering with varying forms of secondary anemia. They were divided into 4 groups: (1) those allowed to recover spontaneously, (2) those assisted by blood transfusions, (3) those to whom iron was given in the form of pills of ferrous carbonate, and (4) those cases treated by both liver and iron. Those cases in the last group showed the most pronounced increase in the rate

of hemoglobin regeneration and this was particularly true of those cases of *hookworm infestation*

**DIET**—G H Whipple (J A M A 91 863 (Sept 22) 1928) states that long term experimental anemias are much more suitable for study than short term cases. For a study of the foodstuffs in combating such an anemia, he divides them into 3 classes (1) the least favorable group for blood hemoglobin regeneration in simple anemia and includes grains and breadstuffs, common vegetables and some fruit, all fish and dairy products, (2) the average middle group including leafy vegetables, skeletal muscles also spleen, pancreas and brains, apricots, prunes, peaches and raisins, and (3) the most potent group for blood regeneration including liver of beef, pig, sheep and calf. Fish liver is practically inert while kidney stands practically on a par with liver.

Following an attempt to obtain a potent **extract of liver**, Whipple states that water soluble extracts contain 20 to 25 per cent, alcoholic extracts 20 to 25 per cent, and watery and alcoholic residues from 25 to 30 per cent of the active materials. Lilly extract No 343, although potent in pernicious anemia, gives only 10 to 15 per cent of the expected reaction of whole liver in the experimental type of anemia.

Iron has been found of little value in the short anemia but in cases of long duration, the addition of **liver and kidney** to the **iron** has greatly enhanced the value of the latter and as much as 140 Gm (9½ ounces) of hemoglobin per 3 weeks period over and above the control level has been obtained.

At the present time a large amount

of experimental work is in progress to determine the potency of various metals and the organic ash of fruits especially apricots in blood hemoglobin regeneration. Nothing definite can be stated other than the fact that arsenic and iodine are frankly negative in this respect.

Conservation of the hemoglobin is of extreme importance in the production of new red blood cells. G H. Whipple and F S Robschert-Robbins (Am J Physiol 83 60 (Dec) 1927) report the conservation of 90 per cent of the hemoglobin in the standard anemia of dogs. Naturally this type of conservation will not test the capacity of the organism to utilize the hemoglobin from food and other material in the regeneration of blood. Many routes have been devised for the introduction of the hemoglobin to demonstrate its conservation. Of these the least suitable is the oral method where only 10 per cent of the hemoglobin is conserved while by the intravenous route 90 per cent of it is saved.

In a study of the human anemias, Whipple discounts the prevalent idea that long continued minor hemorrhages are more severe or serious upon the individual than a single major hemorrhage. Many so-called cases of chronic anemia are the result of resistance to iron therapy and in many instances yield to a dietary regimen.

Anemias as the result of infection should be carefully studied as individual cases, as all will not respond equally. The fact that we explain the disturbance of the mechanism of hemoglobin production by some hypothetical toxin, is evidence of a devious method of concealing our ignorance

The anemias of malignancy and chronic intestinal stricture are usually associated with multiple factors particularly hemorrhage, infection and rapid metabolism of the tissue and toxic split proteins set free in the body

Dietary anemias are frequently prevalent in children and are usually the result of a preponderance of dairy products

In conclusion, Whipple reviews the large number of substances, preparations and extracts available for the treatment of all forms of anemia. Of particular importance in his opinion, relative to the potency of various substances, are peaches, apricots, liver and kidney. He believes there is a group rather than a single substance which is responsible for the potency of liver in anemia. He has shown conclusively that kidney has almost the same potency as liver and that the substances concerned are probably both organic and inorganic.

**ANEMIA, SICKLE CELL.—**  
**PATHOLOGY—**M. Wollstein and K. V. Kreidel (Am J Dis Child 36:998 (Nov) 1928), studying the condition in New York, report that it is as common there as in the South or West. A series of 15 negro children were studied in which 3 of the active cases died of anemia without any other anatomic cause for death. All these cases showed a fatty degeneration of the myocardium and liver, with distension of the sinuses of the spleen with sickle cells, phagocytosis of these same cells by the Kupffer cells in the liver and iron pigment in the spleen, liver and kidneys.

The authors believe the condition to be a familial, hemolytic anemia

with sickle cells present, while in familial icterus the red cells are small. Fragility is usually, but not invariably, increased in hemolytic icterus and normal in sickle cell anemia. Phagocytosis and iron pigmentation occurs in both. The spleen is always large in hemolytic icterus, and in older children and adults in sickle cell anemia it is usually small. The icterus is much deeper in the hemolytic form. Nucleated red cells are numerous in sickle cell anemia and reticulocytes are present in both.

Rich (Bull Johns Hopkins Hosp 43:398 (Dec) 1928) has found a congenital malformation of the splenic sinuses which permits an excessive escape of red cells into the pulp. In the region of the malpighian follicles pools of blood collect which later cause atrophy. The anemia is believed by him to be of a hemolytic type with the development of hemosiderin in the tissues.

**PROGNOSIS—**J. F. Landon and A. V. Lyman (Am J M Sc 178:223 (Aug) 1929) report a case of sickle cell anemia in which the spleen weighed 621 grams. Fourteen months after splenectomy, the condition was described as greatly improved but attention is called to the fact that in no case has splenectomy resulted in an abolishment of the sickle cell trait.

**ANESTHESIA, SPINAL.—**The main drugs employed in spinal anesthesia are stovaine, novocaine and neocaine. Stovaine is furnished in 2 cc ( $\frac{1}{2}$  dram) ampoules, the ampoules being made from alkali-free glass. In each 2 cc ( $\frac{1}{2}$  dram) of the solution there are 0.08 Gm ( $\frac{1}{3}$  grains) of stovaine, 0.04 Gm ( $\frac{1}{3}$  grain) of lactic acid, 0.2 cc (4 minims) of absolute alcohol, and 1.8 cc (30 minims) of distilled water. The alcohol makes the spe-



cific gravity of the solution 0.992, *i.e.*, lighter than cerebrospinal fluid gravity of 1.006

In the upright posture the solution will diffuse upward at the rate of 10 cm per minute. The lactic acid maintains the acidity of the solution and prevents decomposition by the slightly alkaline cerebrospinal fluid. The average dose injected in an adult is 0.05 Gm ( $\frac{5}{16}$  grain) of stovaine or 1.25 cc (20 minims) of the solution. In a child 6 years old the dose is 0.02 Gm ( $\frac{1}{8}$  grain) or 0.5 cc (8 minims) of the solution.

A nickeloid or platinum 20 gauge, spinal needle,  $3\frac{1}{2}$  inches long, of short bevel, attached to a 2 cc glass Luer syringe, are used for the injection. The syringe and needle are prepared by boiling in distilled water, in a clean separate electric sterilizer without contact of alkali or other instruments. The sterilizer and contained syringe and needle are brought to the operating table boiling hot, and placed on a sterile towel to one side of the sitting patient. The glass stovaine ampoules are kept immersed in eosin alcohol. The neck of an ampoule is broken off by an assistant with an alcohol wet sponge, its contents are then drawn into the hot syringe by the operator. This raises the temperature of the injected solution to about that of the body. If the solution is not perfectly clear, if it has a pinkish color from the eosin alcohol solution, it indicates a leaky ampoule and is, of course, discarded.

**TECHNIC**—The patient sits well back on the operating table, as on a bench, with the legs hanging down. The spine is arched by an attendant, who holds the head under the left arm, while the right hand holding the wrist is gently pressed into the patient's abdomen. The lumbar region is wiped off with  $3\frac{1}{2}$  per cent tincture of iodine. A sterile towel is stretched across the crests of the ilia, this passing across the spine of the fourth lumbar vertebra. Counting upward, the first or second lumbar interspace is located. The needle with contained stylet is introduced at right angles to the plane of the back one-quarter inch from the midline or directly in midline, directed slightly inward and upward. There is usually a distinct snap as it passes through the dura. The stylet is then withdrawn and free escape of cerebrospinal fluid indicates entrance into the subarachnoid space. An

amount of fluid is allowed to escape at least equal to the amount of fluid to be injected. Then the syringe containing its measured dose of anesthetic is attached, about 1 cc of cerebrospinal fluid is drawn into the syringe and the mixed solution slowly and steadily injected. This is repeated twice, after which the entire contents of the syringe is slowly injected, the needle withdrawn, and the puncture area covered with a sterile towel. The patient is laid on the back and immediately the head of the table is lowered one foot. The head of the table should be lowered within 20 seconds of the time of injection. The average depth of puncture is between  $1\frac{1}{2}$  and  $2\frac{1}{2}$  inches, in the very obese  $3\frac{1}{2}$  inches. The stovaine can be injected with equal ease with the patient lying on either side as advocated by Pitkin.

The injection is not given unless clear cerebrospinal fluid runs freely from the needle. Regional anesthesia is complete in from 1 to 4 minutes, the area usually extending from the feet to the twelfth rib. The average duration of anesthesia is from 45 to 90 minutes, depending on the amount of anesthetic injected. Inject in the second lumbar interspace for leg, pelvic and lower abdominal operations. Injections above the first lumbar interspace may cause respiratory embarrassment.

**Neocaine**—Neocaine, as employed by H. Koster and L. P. Kasman (*Surg Gynec Obst* 49:617 (Nov) 1929) is used as follows.

Every spinal tap and every injection of an anesthetic solution is made in the interspace between the second and third lumbar vertebrae. They have found that 0.1 Gm ( $1\frac{1}{2}$  grains) of neocaine dissolved in approximately 4 cc (1 dram) of cerebrospinal fluid (the amount necessary to fill 1 ampoule) is sufficient for the average operation below the diaphragm if completion can be expected within 50 minutes. If anesthesia of the thorax and head is desired, 0.250 Gm (4 grains) of neocaine dissolved in 8 cc (2 drams) of cerebrospinal fluid, injected between the second and third lumbar vertebrae, are used. This method applies to adults and children above the age of 7 or 8 years. Under that age the dose must be diminished proportionately. Between the ages of 5 and 8, head anesthesia can be obtained by means of 0.15 to

TABLE 1—*Dosage for Novocaine and Ephedrine for Anesthesia to Various Levels*

Level of anesthesia	Volume of novocaine, spinal fluid, c c	Average novocaine, dosage in Mg	Average length of anesthesia in hours	Injection time in seconds	Ephedrine dosage in Mg
1	35	300	1½	17	95
2	30	200	1¼	15	95
3	25	200	1½	12	80
4	20	150	1¼	10	50
5	15	150	1½	7	30
6	10	100	2	5	0

0.2 Gm ( $2\frac{1}{2}$  to 3 grains) of neocaine dissolved in 6 c c ( $1\frac{1}{2}$  drams) of fluid. Between the ages of 2 and 5, similar anesthesia may be obtained with 0.1 to 0.15 Gm ( $1\frac{1}{2}$  to  $2\frac{1}{2}$  grains) of neocaine dissolved in 4 c c (1 dram) of fluid, and below the age of 2, head anesthesia can be obtained with from 0.05 to 0.1 Gm ( $\frac{5}{8}$  to  $1\frac{1}{2}$  grains) dissolved in 3 c c ( $\frac{3}{4}$  dram) of cerebrospinal fluid.

*Novocaine, spinocaine or Pitkin method*  
After palpation of a convenient lumbar interspace (usually the second or third), local ischemia is produced by firm pressure with the thumbnail for 10 to 20 seconds. A preliminary novocaine skin infiltration may be used if desired. The spinal puncture needle (22 gauge) is then quickly introduced through the blanched area, and advanced slowly through the intraspinal ligament into the dural sac, which is recognized by a slight snap and subsequent lack of resistance. The stylet of the spinal needle is then removed and when fluid wells up into the hub of the needle, the syringe is quickly attached, without loss of fluid, and the required volume of fluid slowly aspirated. The syringe is then detached and the stylet replaced. Another needle is now attached to the syringe and the spinal fluid transferred to the ampoule of novocaine crystals (for dosage, see Table 1). The crystals are dissolved by barbotage, the solution aspirated into the syringe, the needle detached, and any air bubbles expressed.

Five minutes after the ephedrine injection, the stylet is removed from the spinal needle, quickly attached to the syringe, and the solution injected at a rate of 1 c c (16 minims) in 5 seconds without barbotage. The spinal needle is then withdrawn (still attached to the syringe), and with a sterile

sponge held over the site of puncture, the patient is placed in position for operation.

**ADVANTAGES**—Abdominal and pelvic surgery has been facilitated by the perfect analgesia and muscular relaxation, as reported by W. N. Parkinson (J. Florida M. A. 14: 570 (May) 1928) on 500 cases of stavaine anesthesia. He also reports absence of post-operative symptoms, such as nausea and vomiting, gaseous distention, motor restlessness, and kidney and lung complications. O. J. Currie and J. A. Currie (J. M. A. South Africa 2: 440 (Aug. 25) 1928) observed 3 outstanding merits of spinal anesthesia, *ie*, prevention of shock, ease of operating due to perfect relaxation, and absence of post-operative sequelæ, especially pneumonia. B. Rapoport (Anesth. and Analg. 8: 276 (Sept.-Oct.) 1929) supports all the aforementioned opinion and, besides, finds it especially indicated when operating upon old people. He states that this type of case, whether they show it clinically or not, usually has an associated heart, lung or kidney condition, in which case inhalation anesthetic does harm.

Babcock (Surgical Clinics of North America, vol. 6, No. 1), reporting on 20,000 cases, considers spinal anesthesia the ideal anesthetic in *acute abdominal infections*, especially in *appendiceal abscess*, in operative procedures in the *diabetic*, the *nephritic* and the *cholemic*, and in those affected with acute or chronic *respiratory disease*.

**CONTRAINDICATIONS** are *nil*, according to Koster and Kasman (*loc cit*), who employ it in operations from head to foot. They perform *tonsillectomies* and *thyroidectomies* by this method. Other operators limit this method of anesthesia to procedures below the diaphragm. The contra-

indications to spinal anesthesia are, according to Currie and Currie (*loc cit*), shock, any case where the systolic blood-pressure is under 100 mm, and in the extremely neurotic individual. These are also emphasized by Rapoport (*loc cit*), who, in reporting on 500 cases, added that it should never be employed in moribund cases, in the very young infant and in patients where there is a definite disease of the nervous system. Babcock (*loc cit*) finds that spinal anesthesia should not be employed where the abdomen is greatly distended, if there is serious respiratory or cardiac embarrassment, or if patient is in collapse. He also considers a patient a poor risk when obese, wasted, very weak, cachectic, or when in profound shock from injury or hemorrhage. This view is also expressed by L F Sise (New England J M 200 1071 (May 23) 1929).

Possible REACTIONS following use of spinal anesthesia depend, to a certain degree, upon (1) the anesthetic substance or compound used, (2) the method of administration, and (3) the following operative procedure. In reporting upon this phase of spinal anesthesia, C Hughes (Proc Royal Soc Med (Sect Anesthetics) 21 1 (Dec) 1927) finds that with the advent of novocaine, stovaine, alypin and tropocaine the mortality attributed to this form of anesthesia has dropped to such a degree that it compares very favorably with inhalation anesthetics. When cocaine was employed the mortality was high.

Rapoport (*loc cit*) describes the untoward reactions following the use of spinal anesthesia as follows: (1) *Nausea* and *vomiting* usually occurring shortly after the anesthetic is injected into the cerebrospinal canal is of short duration and relieved by a few whiffs of ether or aromatics. It usually disappears within 15 minutes. (2) *Cold perspiration* and *extreme pallor*, usually resulting from extreme drop in blood-pressure, is the bugbear of this form of anesthesia.

All agree that the greatest objection to spinal anesthesia lies in its tendency to cause a *fall in blood-pressure*. In the young and robust individual this means nothing, according to Koster and Kasman (*loc cit*). The fall in blood-pressure is variable, and there is no way of ascertaining beforehand

how much of a drop the pressure will take. They further state that they pay little or no attention to the fall in pressure as long as a pulse can be felt. On the other hand, Hughes (*loc cit*) finds that a low blood-pressure is a contraindication to the use of this form of anesthesia. He finds that there is a normal average fall of 39 per cent in an analysis of 500 cases. The systolic fall is greatest in the hypertension case. He also states that a zero pressure need give no concern unless there be an associated increase in pulse rate.

B Rapoport (*loc cit*) finds that when the pressure is low, the drop produced by spinal anesthesia is much less than when the pressure is high. He finds adrenalin and ephedrine of little value. To sustain his patient he employs **caffeine** and **sodium benzoate**. He feels that the greatest single factor to overcome all spinal reactions is the extreme Trendelenburg position, this is likewise favored by W Barras (Brit J Anesth 6 1 (July) 1928), who further states that **ephedrine** hypodermically controls excessive fall in blood-pressure, but must be administered at least one-half hour before the spinal anesthetic is employed.

N F Ockerblad and T G Dillon, in reporting on 250 cases of spinal anesthesia (J Urol 21 77 (Jan) 1929) state that **ephedrine** was employed on account of its sustaining effect on blood-pressure. In the cases of hypotension, ephedrine was given prior to operation until there was an increase of 20 to 30 mm above normal for the particular patient. During the operation, if a tendency for the pressure to drop is noticed, 0.05 Gm ( $\frac{5}{8}$  grain) of ephedrine is given at intervals of from 3 to 5 minutes until it rises.

This ephedrine effect on blood-pressure is further reported by H G Holder (California and West Med 29 246 (Oct) 1928). He states that where it was employed, the average drop in blood-pressure was 12.8 mm. When *not* employed—27.5 mm.

L F Sise (*loc cit*) in reporting upon novocaine spinal anesthesia finds that **ephedrine** is the best pre-operative prophylactic, as it helps maintain the peripheral resistance. In the event of a sudden drop in blood-pressure **epinephrine-saline solution** is employed intravenously, along with the **extreme Trendelenburg position** together with

oxygen inhalation, CO<sub>2</sub>, or, in respiratory failure, artificial respiration

All operators are agreed that it is most desirable to prevent the great drop in blood-pressure that sometimes results, in spite of all prophylaxis employed, and when the patient does not respond to the ordinary treatment *collapse* results

C Hughes (*loc cit*) prefers to use **strychnine** and **caffeine** and the placing of the patient in the **extreme Trendelenburg position**. This is likewise emphasized by Rapoport, Babcock and Sise

When a condition of *syncope* was reached R Bloch (Presse méd 37 108 (Jan 23) 1929) employed **caffeine** injected into the spinal subarachnoid space. He says the pulse and respiration reappeared immediately, whereas a previous intracardiac injection of epinephrin and a few minutes of artificial respiration proved of no avail. The inhalation of **amyl nitrate** revived a case reported by Fiézes (Bull et mém Soc nat de Chir 54 238 (Feb 15) 1928). The intracardiac injection of 2 cc (32 minims) 1-1000 solution of **adrenalin chloride** caused a return of cardiac function, according to C Dujarier (Paris méd (Dec 15) 1928)

**UNTOWARD EFFECTS**—H Hilario-wicz and M Szajna (Ztschr f d ges exper Med 64 470 (Feb 18) 1929) report that the stimulation of the respiratory centers in spinal anesthesia is best accomplished by the addition of **potassium chloride** to the anesthetizing solution. In addition to its favorable action on the respiratory centers, it increases the effectiveness of the anesthetic. They also point out the objectionable features of the intradural administration of **caffeine**, **atropine**, **lobeline** and **strychnine**

J Rollet (J de med de Lyon 9 167 (Mar 20) 1928) states that the *ocular complications* following spinal anesthesia which were first described by C Adam and then by Loeser and Roeder in 1906, are rare, their frequency being about 1 in every 300 cases of spinal anesthesia. Paralysis of the external rectus are far the most common, occurring in more than 90 per cent of the cases. Other ocular palsies are exceptional despite the toxicity of cocaine, most of the paralyzes have followed the **stovaine** or **novocaine**, and in only one or two cases has cocaine been incriminated. As regards the

size of the dose, although at first paralyzes occurred after a small dose, recently they have followed large doses. The paralyzes appeared usually a week after the operation and subsided in the course of 6 or 7 weeks. Of the numerous theories suggested to explain their occurrence, the most likely appears to be localization of an attenuated meningeal process. Recovery is usually spontaneous but may be hastened by treatment with **strychnine** or **urotropine** or **anti-syphilitic drugs**

M Nonne and H Demme (Wien klin Wchnschr 41 1002 (July 12) 1928) report a case of a man, aged 51 years, who developed a *paralysis* which did not entirely disappear. There remained a motor and sensory paralysis from the point of injection downward, with severe bladder and rectal disturbances. Cystopyelitis and intestinal tuberculosis developed and 16 months after the operation the patient died. **Tutocain** was used to induce the spinal anesthesia in this case and the operation was for bilateral inguinal hernia. Necropsy showed marked degeneration of the posterior portion of the conus and in the cauda equina, with corresponding degeneration in the posterior columns. Tuberculosis and syphilis were both present in this case, though the former was believed to have developed during the patient's long confinement and the latter was first diagnosed at necropsy and then the result of the examination of the aorta

C Lepoutre (Bull et mém soc nat de Chir 53 456 (Apr 2) 1927) reports a case operated upon for right inguinal hernia under spinal anesthesia, which later developed *incontinence of urine* and *anesthesia of the perineal region*. Lepoutre believes that occasionally permanent nervous disturbances may result but only in the presence of syphilis, tuberculosis and other nervous diseases. In some cases, there may be paralysis of the lower limbs or incontinence of the urine or disturbance limited to one nerve center or root. In others, these phenomena may be due to extradural hemorrhage which compresses nerve centers. Sometimes the lesions are so strictly localized as to suggest injury to a nerve center or bundle of fibers by direct puncture, destruction by hematoma or dissociation by the intravenous injection of the anesthetic

As a precaution when employing spinal anesthesia, it is well never to inject the drug until the spinal fluid is flowing normally from the needle, showing that it has been correctly inserted

**FAILURES**—Failures are invariably due to either inexperience or faulty technic Rapoport, for example, had 11 failures in the first 100 cases, but only 2 in the fourth and fifth hundred

Stout quotes failure in 5 to 6 per cent, and gives as a cause an idiosyncrasy of the individual to novocaine

Where Babcock's solution of *stovaine* was employed in over 25,000 cases, failure of anesthesia was reported in less than 1 in 500 In quite a few instances there was delayed anesthesia, and in those cases where there was no anesthesia the injection was repeated within 10 minutes with perfect anesthesia, thus proving conclusively that the failure in the first instance was due to faulty technic

F W Rankin and C F McCuskey (*Anesth and Analg* 9 44 (Jan-Feb) 1930), in 325 operations on the colon and sigmoid, in the Mayo Clinic, where spinal anesthesia was employed, had 88 per cent success, the 12 per cent failure they felt was due to faulty technic in the administration

**USE IN OBSTETRICS**—In discussing the effects of spinal anesthesia in obstetrics Binet (*Bull Soc d'obst et de gynéc* 18 148 (Feb) 1929) finds spinal anesthesia causes a softening of cervix, making D and C easily and rapidly performed

Andehert and Estienny (*Rev franç gynéc et obst* (Oct) 1928) find that spinal anesthesia causes better perineal relaxation, therefore less tendency to laceration It was used in 29 cases

In the experience of J Ducuing (*Bull Soc d'obst et de gynéc* 18 179 (Feb) 1929), uterine contractions became violent but painless He found that spinal anesthesia never started the contractions In 62 cases of spinal anesthesia for abdominal operations he never observed interruption of pregnancy He did observe that when employing spinal anesthesia during labor, the expulsion of the fetus is slower He finds the cervix relaxed but not to the same degree as other sphincters In Cesarean section the incision of the uterus is less bloody and contracts well after suturing

**SACRAL**—H B Hermann and E Dózsa (*Surg Gynec Obst* 48 375 (Mar) 1929) report on 1000 cases of operations of the kidney and ureter under paravertebral anesthesia It is their experience that none of the disadvantages, transitory or permanent, which arise with inhalation, splanchnic or spinal anesthesia, are encountered in the use of paravertebral anesthesia They, however, state that a neurotic and apprehensive patient should not have this method employed There is no contraindication for its use

### ANEURYSM.—ABDOMINAL.—

This usually occurs in the upper portion of the abdomen proximal to or in the region of the celiac axis The sac, as a rule, presents anteriorly and to the left side The symptoms are variable, depending largely upon the size and location of the sac Pain is common, and pressure symptoms may predominate An expansile pulsating tumor, situated either in the epigastrium or posteriorly in the left upper lumbar region, may be felt Abdominal aneurysm should be differentiated (H L Farmer, *Am J Roentgenol* 18 550 (Dec) 1927) from tabetic crises, neuritis, gall-stones, pancreatic stones, lead colic, appendicitis, peptic ulcer, gumma of the liver, nephrolithiasis, and benign and malignant tumors of the stomach, pancreas, kidney, and omentum The abnormal throbbing of the aorta noted in neurotic and hysterical states, forceful pulsation in aortic insufficiency, and preternatural pulsation found in anemia and in arteriosclerosis in old men with thin abdominal walls must not be taken for signs of aneurysm Direct x-ray visualization of the mass may be possible if there is sufficient calcification in the walls of the sac and vessel If the aneurysm is located high under the dome of the diaphragm,

it may be directly outlined by the adjacent air bubble in the stomach, and its pulsation may be studied under the roentgenoscope. The aneurysm may be also directly visualized with the aid of pneumoperitoneum, or by injecting air into the colon. The sharp clear-cut areas of destruction in the bodies of the vertebræ are fairly typical. The intervertebral disks remain intact. In each involved vertebra, there is an individual crescent-shaped area of bone destruction, giving the spine a scalloped appearance, chiefly along the left anterior surface of the vertebral bodies.

The lower ribs on the left side, or the transverse processes of the upper lumbar vertebræ, may show rarefaction from pressure absorption. The absence of pulsation in the iliac and femoral arteries, mentioned by Osler, is also suggestive. The prognosis is unfavorable, the duration of the condition varying from three months to three years. Death usually results from rupture of the aneurysm. Some symptomatic relief may follow the use of heroic doses of iodides and mercury without, however, any decrease in the size of the sac.

In a case of abdominal aneurysm reported by K. P. Fooks (Brit M J 1 97 (Jan 19) 1929), a man of 35 suddenly developed swelling of both legs with pain, which later was found to be due to a thrombosis of the inferior vena cava with an abdominal aneurysm. There was intermittent claudication, difficulty in walking, and ulceration of the leg. At the necropsy, a large saccular aneurysm was found at the bifurcation of the aorta, which had eroded the bodies of the fourth and fifth lum-

bar vertebræ to within half an inch of the spinal canal. The inferior vena cava was indistinguishable 2 inches below the renal veins, where it became stretched out over the sac of the aneurysm as a fibrous band. The femoral and iliac veins were represented by thick fibrous cords caused by the rupture of the aneurysm into the retroperitoneal tissues.

Multiple traumatic abdominal aneurysm is recorded by J. McFadzean (Brit M J 2 154 (July 28) 1928) in an old man. All the large arteries of the abdomen, from the origin of the celiac axis to the termination of the external iliac arteries on either side, were degenerate, calcified, irregularly dilated and aneurysmal. The thoracic aorta and the other large vessels of the body showed only a slight degree of atheroma. The condition was attributed to the occupation of the patient who had been an acrobat and trapeze artist. Death resulted from the rupture of an aneurysm.

In the patient of E. de Massary and P. Flandrin (Bull et mém Soc méd d hôp de Paris 52 1205 (July 19)), a man of 53 years of age, who developed sudden hemorrhage from the mouth and anus, which recurred after 5 days with death a few days later, an aneurysm of the terminal portion of the aorta, which had eroded deeply into the bodies of the vertebræ, had ruptured into the duodenum. The patient was a syphilitic and a bicycle racer.

**AORTIC**—According to Schisler (J A M A 93 231 (July 20) 1929), about 80 or 90 per cent of the aortic aneurysms represent a complication or end-result of syphilitic aortitis. The early recognition of aortic disease by the clinical symptoms is important.

Three cases are reported aneurysm of the descending aorta, aneurysm of the arch which ruptured into the esophagus, and an abdominal aneurysm which, showed by pneumoperitoneum, as a large peritoneal mass at the level of the first and second lumbar vertebræ, about the size of a fist, with definite expansile pulsation.

In a case of E. Bordet and J. Lereboullet (*Arch d mal du coeur* 22 314 (May) 1929), a large aneurysm of the ascending aorta simulated, on x-ray examination, a dilatation of the pulmonary artery. At necropsy it was found that the aneurysm originated from the anterior wall of the aorta, 1 centimeter above the aortic valve, and compressed the pulmonary artery.

Spontaneous rupture of an aortic aneurysm into the superior vena cava is reported by S. J. House and E. W. Goodpasture (*Am Heart J* 3 682 (Aug) 1928), who refer to 74 cases found in the literature.

Of aneurysms of the descending aorta, S. Zisa (*Arch di pat e clin med* 7 342 (Sept) 1928) in 4 cases noted symptoms of compression of the left bronchus and the internal mammary vein in the first case, paroxysmal anginal pain in the second, pain and dyspnea with signs of pressure in the third, and cardiac dilatation in the last.

Compression of the spinal cord by an aortic aneurysm was noted by E. Stengel (*Med Klin* 24 1475 (Sept 21) 1928) in a midwife, aged 61, who had become infected during the delivery of a syphilitic woman 20 years before. There was complete paraplegia with an unusually wide anesthetic zone at the level of emergence of the third to the sixth dorsal nerves.

An aneurysm the size of a fist was present in the descending aorta. A remission followed antisyphilitic treatment.

In another case, reported by Devic and Janin (*Lyon méd* 141 309 (Mar 18) 1928), of a woman aged 54, the first sign of an aortic aneurysm was the sudden appearance of spasmodic and very pronounced paraplegia. Lipiodol was arrested at the level of the fourth thoracic vertebra. Laminectomy was performed, and a week later the patient died during an attack of dyspnea. A large aneurysm of the aorta was found on the anterior surface of the spinal canal.

Dissecting aneurysms of the aorta give the following rather characteristic symptoms, according to L. T. Gager (*Ann Int Med* 2 658 (Jan) 1929). A sudden onset, usually following strain, pain which is severe, continuous, and often has a significant distribution, anomalies of the circulation, and remote effects from disturbances of the blood supply in other organs or systems of the body.

**TREATMENT**—M. Pinard (*Bull et mém Soc méd des hôp de Paris* 51 1711 (Jan 5) 1928) advocates, for syphilitic aneurysm, intravenous injections of **neoarsphenamine** in doses from 1.10 Gm to 1.20 Gm (17 to 19 grains) at the rate of about 5 injections in the first week and then at longer intervals. In the discussion of this paper, Sicard, Caussade, and Hallé favor the use of smaller doses given subcutaneously, intramuscularly, or by mouth.

H. A. Hare (*M J and Rec* 128 167 (Aug 15) 1928) has employed **wiring** in the treatment of aortic aneurysm 37 times without accident at the time of operation or any evil sequence which could be attributed to it. He be-

lieves the treatment often prolongs life, and that its chief advantage is the almost immediate relief from pain. It is essential that the gold wire used shall not have the ability to spring outward and erode the wall of the sac, but have enough platinum in it to stiffen it, so that it may be pushed through the needle, but it must coil in the sac as a tangled mass in which the clot forms with the aid of the coagulating effect of the positive pole of a galvanic battery. Care must be taken not to exceed 40 or 50 milliamperes, the needle must be insulated to prevent electrolytic destruction of the skin and wall of the sac.

Other observers have found that relatively few patients live more than a year after wiring.

In a patient aged 46 years, who had almost continuous attacks of angina pectoris, D. Giordano (*Riforma med* 44:49 (Jan 16) 1928) performed an anterior mediastinotomy. The sternum was exposed and cut transversely below the insertion of the second rib, and the first and second ribs and clavicle were sectioned outside of their attachment to the sternum. An aneurysm of the aorta, the size of an egg, was disclosed and a pre-aneurysmatic sympathectomy was performed. The osteoplastic flap was removed and the soft parts sutured. The operation was followed by relief from dyspnea and other subjective symptoms. Having a positive Wassermann, 2 series of intravenous injections of salvarsan were given before the operation.

#### CAROTID JUGULAR ANASTOMOSIS FOR THORACIC ANEURYSM

—The effects of end-to-end anastomosis between the proximal and the cardiac segment of the common car-

otid artery and the internal jugular vein are reported by W. W. Babcock (*S. Clin. North America* 9:1031 (Oct) 1929) 4 years after the operation. The aim of the operation was to reduce the intrasaccular pressure and to prevent rupture or further increase in size. Following the operation, the large aneurysmal sac which had perforated the ribs became reduced in size, the pain largely disappeared, and the patient lived in a much improved condition for over 4 years, finally dying of a pre-existing cardiac condition. In a second patient, a married woman aged 45 years, with a small aneurysm of the aorta, angina on exertion had prevented all work for 18 months. After the carotid jugular anastomosis, there was a striking improvement in subjective symptoms, with disappearance of the angina, and the patient was able to resume her work as a housewife.

McCarthy (*Ann Surg*, Feb, 1930) reports 10 cases of aneurysm of the thoracic aorta with operation by Babcock's method of carotid-jugular anastomosis in 8 cases. One patient died on the operating table, apparently from nitrous-oxide anesthesia, 1, from apparent embolism, believed to have come from the ligated end of the common carotid artery, 1 patient died suddenly 5 weeks after the operation, apparently from myocardial failure, the fourth patient, after great relief from pain and dyspnea for 4 weeks, died during a paroxysm of coughing, from occlusion of the trachea by the aneurysm. Four patients have shown marked improvement since the operation. The operation, by accelerating the flow of blood through the sac into the low-pressure descending vena cava, serves as a



method of decompressing the aneurysm. The effects of end-to-end are quite different from the dangerous side-to-side arteriovenous openings.

**ARTERIOVENOUS** — Arteriovenous aneurysms may be classified in 2 large groups: (1) simple aneurysms and (2) aneurysms with a sac. The latter may be further divided into those with a true sac and those with a false sac. It is possible also to classify them according to the end-aneurysmal appearance after they have been opened, according to P. Moure (*Bull et mém Soc nat de chir* 54 391 (Mar 17) 1928). That clots within the sac are absent is due to the fact that the epithelium of the vein quickly covers over the communication and prevents local coagulation. There is no tendency towards spontaneous cure, and Leriche and Stulz have shown that the heart enlarges because of increased pressure and does not return to normal after ablation of the aneurysm.

The physiologic effects of arteriovenous aneurysms upon the circulation and their importance in relation to surgical treatment have been studied by E. Holman (*California and West Med* 30 307 (May) 1929). An arteriovenous fistula is followed by a marked fall in blood-pressure and an increase in pulse rate, for which there is a compensatory increase in the total blood volume. The heart and the artery and vein proximal to a larger fistula invariably dilate. Cardiac dilatation may progress to complete myocardial failure.

**SYMPTOMS** — Characteristic features of the lesion are, according to E. Holman (*S Clin North America* 8 1413 (Dec) 1928), (1) a thrill and bruit continuous throughout the car-

diac cycle but intensified during systole, (2) a transient increase in the blood-pressure and a fall in the pulse rate when the fistula is closed by digital compression, (3) a high content of oxygen in the venous blood obtained from the veins near the lesion as compared with the oxygen content of blood removed from the veins remotely situated.

A thrill, according to J. de J. Pemberton (*Arch Surg* 16 469 (Feb) 1928) is pathognomonic, and its point of greatest intensity marks the site of the lesion. The increase in the size of the limb when the lesion is peripheral, the distortion and engorgement of the vessels, the increase in the temperature near the fistula, and the decrease in the temperature distally, the trophic disturbances, and the abnormal sensations in the affected part are usually marked. Systemic signs consist in changes of the pulse rate and blood-pressure, an increase in the blood volume, and the size of the heart, and evidence of pathological changes in the heart.

An unusual case of arteriovenous aneurysm of the left superior thyroid vessel is recorded by J. M. Mora (*Surg, Gynec and Obst* 48 123 (Jan) 1929), in which the condition followed a lobectomy on the same side.

Cardiac disturbances, suggesting mitral stenosis, were observed by E. Melchior (*Med Klin* 25 514 (Mar 28) 1929), who reports the condition of a man, aged 30, who in 1918 had sustained a gunshot wound in the pelvis. In 1920 cardiac disturbance developed, and in 1924 an aneurysm of the left thigh with swelling of the left leg and varicose veins and thickened and bluish-red skin were found.

After the operative closure of the communication between femoral artery and vein, the patient recovered in a short time, and the cardiac disturbances disappeared. It is desirable to operate early for arteriovenous aneurysms, to prevent cardiac disturbances, and it is also evident that the presence of severe cardiac disturbances does not contra-indicate operation.

In a traumatic subclavian arteriovenous aneurysm of 8 years' duration reported by E. L. Gilcreest (*Arch Surg* 19:375 (Sept) 1929), there was (1) enormous swelling of the right side of the chest, the right portion of the shoulder girdle and the entire right arm and hand, with great distention of veins in these parts, (2) cardiac dilatation and hypertrophy resulting from increased volume flow through the heart incident to the production of the fistula, (3) Branham's bradycardiac reaction and associated variations in blood-pressure due to an increase in blood volume caused by the fistula, (4) characteristic bruit and thrill transmitted centrifugally, (5) increase of oxygen content in veins distal to the lesion, (6) dilatation of the proximal artery, diminution of the distal artery and great dilatation and thickening of the distal vein. Proximal ligations of the artery and veins improved the condition but did not effect a cure. Subsequent distal ligations, 10 months later, completing the quadruple ligation, were followed by recovery.

In an arteriovenous aneurysm of the femoral artery in a man 26 years of age, following a shrapnel wound, F. Fedeli (*Arch ital di chir* 20:98, 1927), found that the curves made of the pulse over both femoral arteries and the apex of the heart showed that

the expansions of the aneurysmal sac were greater than those of the normal artery, and that in the artery with aneurysm there was a slight retardation in the beginning of the arterial diastole from the time of opening of the aortic semilunar valve. Diastole was more abrupt, and the transition from arterial diastole to systole took place more rapidly in the artery with aneurysm than in the normal artery, but the dicrotic wave was more marked in the normal artery. These differences were ascribed to the decrease in the elasticity of the wall of the artery with the aneurysm. The more rapid emptying of the artery with the aneurysm was due to the passage of a part of the blood into the vein.

In a case reported by R. Leriche (*Bull et mém Soc nat de chir* 53:1397 (Dec 24) 1927), at the femoral vessels, there was considerable cardiac reflux, with cardiac resonance, dilatation of the heart, and a murmur. The aneurysm was cured by operation, but there was very slow diminution in the volume of the heart, and the murmur persisted after 6 months. This is in accordance with the general opinion that the heart changes may be permanent after the aneurysm has been cured by operation. Leriche reports 9 cases, in only 5 of which could the exact location of the lesion be determined. The arteriovenous fistula occurred instantly at the time of the injury. In some instances, there were dilatations of the vein. In the one case of arterial dilatation, the elastic fibers had disappeared in the greater part of the arterial pocket, and the muscular fibers were separated. When the sac is formed secondarily, at the expense

of an encysted hematoma, it does not take long for the formation of an arteriovenous aneurysm. Leriche has seen complete endothelialization after 14 days. He is of the opinion that the connective tissue proliferation which welds the artery and vein together is due to transformations such as occur in all traumatized connective tissue.

**PROGNOSIS**, according to Pemberton (*loc cit*), depends upon the size of the fistulous opening. In rare cases, a fistula closes spontaneously, but this occurs only in the early months. In other cases there is a tendency toward enlargement of the opening, with increasing embarrassment of the circulation and death from heart disease.

**TREATMENT** — Pemberton (*loc cit*) states that treatment has for its object the obliteration of the arterial leak without interfering with the distal circulation. The method of accomplishing this varies with the type and site of the lesion and the efficiency of the collateral circulation. Pemberton analyzes 41 cases of arterial and arteriovenous aneurysm in which operation was performed. Twenty-five of these were arteriovenous, 16 were acquired, and 9 were congenital.

The operation of choice, according to Holman (*loc cit*), is **quadruple ligation** of the artery and vein proximal and distal to the communication, followed by **excision** of the fistula. The elimination of a fistula may precipitate cardiac decompensation from overdilatation of an already dilated heart. To prevent this excessive dilatation, **venesection** may be necessary in the course of the operation to remove the increased volume of blood which has accumulated in the

circulatory system during the existence of the fistula, and prolonged care is necessary after the operation, to prevent myocardial strain from the increase in diastolic pressure following the elimination of the fistula.

Moure (*loc cit*) points out that repair should only be attempted after cicatrization is complete. Otherwise, there is danger of secondary hemorrhage or infection, and the sutures are likely to tear through from the friability of the tissues. Unless there is great danger of spontaneous rupture or severe cardiac damage, 3 months should elapse after closure of the wound or of external fistulæ before the operation. Absolute hemostasis is essential, and it is well to empty the limb of blood by means of a Martin bandage and to apply a tourniquet or to compress the vessels by means of a rubber tube after their exposure. The type of the operation is determined by the condition of the artery. **Quadruple ligation** alone is not recommended as it does not assure absolute exclusion of blood from the aneurysm. Many perform a quadruple ligation and then **remove** the sac or segment of communication, but in agreement with Lecène and others, Moure (*loc cit*) believes it best to attack the lesion by the endosaccular route and determine the measures to be taken on the basis of the character of the communication and the condition of the vessels. When this is done, a long, tedious, and often unsuccessful dissection of the area is avoided, and it is at once seen whether the re-establishment of continuity of the artery is possible or whether the vessel must be sacrificed. When sacrifice of the vessel is necessary, hemostasis may be easily and

effectively established by internal ligation or suture, after the plan of the obliterating endo-aneurysmorrhaphy of Matas.

Grégoire (Bull et mém Soc nat de chir 53 118, 1927), however, believes that arteriovenous aneurysms affecting small vessels are best treated by quadruple ligation. When large vessels are involved, the problem of treatment is difficult. In simple arteriovenous aneurysms, every effort should be made to save the artery. Ligation of the communicating channel is the ideal procedure. Suture of the arterial orifice may be carried out if the vessel is large and ligation is impossible. Double ligation of the vein close to the communication is done when other methods are impossible. The complicated arteriovenous aneurysm is entirely different. A sacculatation developing on the artery is due to a second injury to the arterial wall at the time of the original trauma. The sac is, therefore, a separate pathological entity, not caused by the arteriovenous aneurysm *per se*. Dilatation of the vein may be produced in the same way. If only the vein is sacculated in these complicated cases, repair of the artery may be tried, but if the vein is affected quadruple ligation and excision of the aneurysm is the only feasible method, as attempts at repair are followed by recurrence of the lesion.

If the aneurysm is situated distally upon an extremity, Lecène places an Esmarch bandage around the limb distal to the lesion and a tourniquet proximal to it. When the aneurysm is higher up, temporary ligation of the artery with a red rubber tube (Nélaton) is recommended. In the method of Matas, the vein is opened

opposite the communication, and the opening between the artery and vein closed by suture. In 2 cases affecting the femoral artery in Scarpa's triangle, the external iliac artery was exposed and occluded by a small rubber sound. On exposing the aneurysm and opening the vein, however, the hemorrhage was so great that quadruple ligation of the vein and artery close to the fistulous opening was resorted to. Numerous enlarged veins draining into the femoral also required ligation. In the second case, a previous operation had been done with ligation too far away from the site of the aneurysm to effect a cure. Lecène believes that in young persons there is no danger of circulatory disturbances in the extremities following quadruple ligation, and attempts to save the main artery are time-consuming and carry with them grave danger of secondary hemorrhage. If a direct and accessible communication is found, lateral suture of the arterial wall may be justified. Ligation should be made as close to the aneurysmal communication as possible. It is not always necessary to open both the vessels to the periphery. In some cases the opening may be closed by whipping it over with sutures.

From a study of about 40 arteriovenous aneurysms observed during the war, P Descomps (Bull et mém Soc nat de chir 54 104 (Feb 4) 1928) suggests for the examination of endovascular lesions a temporary bipolar hemostasis, and the simplest method of accomplishing this is compression *en masse* of the entire limb. When the lesion is a simple arteriovenous fistula, the 2 vessels should be separated, the vein ligated laterally,

and the arterial strait ligated or sutured. When the arteriovenous fistula is complicated by the presence of a sac more or less surrounded by secondary hematmata, both intravascular and extravascular exploration should be done.

The arterial circulation must be conserved as much as possible. Some cases are favorable for arterial conservation, but by far the larger number are not. With the exception of certain cases of simple arteriovenous fistula closed under ligatures and certain exceptional cases of lateral suturing of the artery after double venous ligation, **extirpation** of the aneurysmal focus following dissections with peripheral ligation as close as possible seems to be the only method feasible after endosaccular exploration, and after a vain attempt at arterial conservation, the only safe method.

If the sac contains venous blood, Caraven (Bull et mém Soc nat de chir 54 116 (Feb 4) 1928), when the sac is arterial, finds the operation much more difficult than when it is venous, and also when the aneurysm is close to the root of the limb. In an arteriovenous fistula of the axillary vessels immediately below the clavicle, Caraven made a triple ligature and shut off the upper end of the vein with a muscle tampon, and then **incised** the intermediate arterial aneurysm, an ideal operation by suture not being feasible.

P Mocquot (Bull et mém Soc nat de chir 53 1150 (Nov 5) 1927), concludes that **extirpation**, if not the ideal method for arteriovenous aneurysm, is at least the procedure which is most frequently indicated and which gives the most constant results.

An excision of the sac together with small parts of the 2 efferent and 2 afferent veins and **closure of the fistulous communication** of the brachial artery, with a double suture of fine silk, is reported by Stetten (Ann Surg 87 462, 1928). Following the operation, there was an ischemic paralysis of the arm, attributed by the author to the use of the Esmarch bandage.

In 9 cases reported by Leriche, there were excellent results from **resection of the fistula with quadruple ligation** of the artery and vein.

In 9 cases treated by Auvray (Bull et mém Soc nat de chirurg 55 1156, 1927), in 1 a lateral suture of the artery was used with satisfactory results, in the 8 others—war wounds—**quadruple ligation with extirpation of the sac** was employed. These communications involved the upper part of the axilla, the lower part of the axilla, the upper part of the brachial vessels, the elbow, the superficial femoral vessels at the apex of Scarpa's triangle, the popliteal space, the external carotid artery and internal jugular vein, and the common carotid and internal jugular vein. In none of these did any serious disturbance of the circulation follow. However, in a recent stab wound of the femoral artery at the root of the thigh, a suture was found to be difficult. Two ligatures were employed, one above and the other below the arterial wound which was just above the division of the artery into the deep and superficial branches. Gangrene, necessitating amputation, followed the ligation. It should be emphasized that the development of a collateral circulation after a well-established arteriovenous communication pro-

duces the danger of gangrene from ligation

In a patient of H Frund (Beitr z klin Chir 142 221, 1928), an aneurysm of the internal carotid artery in the cavernous sinus resulted in the development of a high-grade pulsating exophthalmos. Ligation of the common carotid was impossible, as even with a transient compression disturbances of consciousness appeared, while the rapid progression of symptoms made any attempt at conservative treatment inadvisable. Depending upon the tendency of free fascial transplants to shrink, 2 flaps of fascia were placed around the common carotid, to cause a gradual choking off of that vessel. Following the operation, the protrusion of the bulb regressed very rapidly, and 3 weeks later it was possible to expose the carotid again and definitely ligate it. This time it was observed that the fascial strips had fused and surrounded the carotid as a markedly thickened, rigid ring with considerable constriction and only slight pulsation above the constriction. Frund reports that Kerr has successfully treated 3 cases in this same manner. Fascial strips may also be used in other regions of the body where the sudden interruption of a large vessel is dangerous. Fourteen days after the application of the fascia, the ligation may be accomplished without danger.

#### CAROTID BIFURCATION.—

D Petit-Dutaillis (Bull et mém Soc nat de chir 54 734 (May 26) 1928), to avoid the danger of cerebral anemia, in the treatment of aneurysm of the bifurcation of the common carotid, first ligates the external and internal carotid arteries just above the aneurysm, clamps the arteries distal to

the ligatures, and divides them between the ligatures and the clamps. He then performs an end-to-end anastomosis between the external and internal carotid arteries, and completes the operation by ligating the common carotid artery proximal to the aneurysm and then extirpating the sac. Following this operation, blood passes from the external carotid on the opposite side, across the midline to the external carotid on the affected side, and from here it passes through the artificial anastomosis into the internal carotid and then up into the cerebral hemisphere. In a patient thus treated, recovery was uneventful, and when the patient was re-examined 18 months later he was in good condition. Pulsations were present in the temporal artery of the affected side and could be heard with the stethoscope at the site of the anastomosis. An anastomosis of the external and internal carotids in lesions of the carotid bifurcation was first proposed by Quénu in 1907. Lefevie effected such an anastomosis with good results in a wound of the carotid bulb.

The case here reported is the second which has been done on a human being and the first in which it was done following the resection of an aneurysm. Of 14 collected cases of resection of the carotid bulb for aneurysm in which anastomosis was not done, serious cerebral damage resulted in 5 and terminated fatally in 2. Conservative endo-aneurysmorrhaphies are inapplicable to this region, and reconstruction of the carotids by suture is mechanically not feasible. As the direction of blood flow in an anastomosis between the external and internal carotids varies in different subjects, careful inspec-

tion should be made before uniting the vessels. In old, long-standing aneurysms, in which there has been time for the development of a collateral circulation and inflammatory changes and adhesions add greatly to the difficulty of dissection, simple removal of the sac with ligation of the 3 trunks is probably the operation of choice.

Aneurysms at or near the junction of **INTERNAL CAROTID** artery **AND CIRCLE OF WILLIS** may be divided, according to their etiology, into mycotic, traumatic, syphilitic, arteriosclerotic and congenital. F Albright (Bull Johns Hopkins Hosp 44 215 (Apr) 1929) describes 2 cases with localizing symptoms before death and reviews 30 cases selected from the literature. The symptoms may be divided into 2 main subgroups (1) Neighborhood symptoms due to involvement of adjacent structures, and (2) symptoms arising from leakage of blood into the subarachnoid space. The third nerve was involved in every case reviewed. The pain from involvement of the fifth nerve may be relieved by compressing the common carotid artery in the neck, an important sign. In 1 case, the internal carotid artery was ligated, without success. If the aneurysm is small, the neighboring symptoms may not become manifest until partial rupture and the formation of a false aneurysm occurs.

**CEREBRAL**—Of 3 cases reported by I J Sands (Arch Neurol and Psychiat 21 37 (Jan) 1929), 1 illustrates the arteriosclerotic type of cerebral aneurysm, the second, the embolic type, and the third represents an aneurysm probably caused by a congenital weakness of the ves-

sel wall as there was no evidence of any arteriosclerosis, of local or general infection, or endocarditis to explain the cause of the aneurysm.

A congenital cerebral aneurysm of the right posterior cerebral artery, measuring about  $\frac{3}{4}$  by  $\frac{1}{2}$  inch (19 by 12 mm), occurring in a man of 25 years of age, is reported by E L Graff (Guy's Hosp Rep 78 493 (Oct) 1928). Four attacks of leakage occurred, with unconsciousness, dizziness, paralysis of the left half of the body, left lower quadrant hemianopsia, followed by a lateral nystagmus of both eyes, and finally death from intracranial hemorrhage. The 4 groups of symptoms caused by leakage or rupture of a cerebral aneurysm are (1) Those of elderly persons with arteriosclerosis, (2) those simulating meningitis, with loss of consciousness, (3) those with no loss of consciousness but with typical signs of meningitis, and (4) those with signs of intracerebral hemorrhage without meningeal signs. The author's case belongs in the last group. In a young subject with a negative Wassermann reaction and no arterial disease or infective endocarditis, the probable cause of recurrent hemiplegias on the same side is the leakage of a congenital cerebral aneurysm. In the final attack, the lumbar puncture showed increased pressure and almost pure blood.

Two additional cases of patients who died from rupture of intracranial aneurysm are reported by B R Shore (Arch Neurol and Psych 21 607 (Mar) 1929). In 1 case the ruptured aneurysm was situated at the junction of the right middle cerebral and right posterior communicating arteries, in the second case, an aneurysm of

the basilar artery ruptured. One was probably of congenital origin, while the other was considered as having been of the arteriosclerotic type. The gradual and progressive character of the cerebral symptoms, combined with evidence of irritation of the nerves at the base of the brain, was sufficient at least to suggest a clinical diagnosis of ruptured intracranial aneurysm in these 2 cases.

Aneurysm of the **EXTERNAL ILIAC** artery with rapid development was attacked through a low midline abdominal incision by Villechaise and Mouchet (*Bull et mém Soc nat de chir* 53 708 (May 28) 1927). The patient, aged 36, with no signs of accident, developed a small aneurysmal swelling in the left crural region which became very painful and later rapidly enlarged to the size of an orange, and rupture threatened. The Wassermann reaction was negative. The external iliac artery was **ligated** near its origin. The peritoneum was stripped back and ligatures were placed on the external iliac artery above and below the sac and on the femoral artery and vein. The sac was laboriously **extirpated**, and the skin closed around a drain. The wound suppurred, and the patient recovered with deficient circulation in the leg.

H Joachin and M A Goldzieher (*Am J M Sc* 177 849 (June) 1929) report a case of bilateral aneurysm of the common iliac arteries of arteriosclerotic origin in which syphilis was definitely excluded. Diagnosis was made by palpation of a large pulsating mass in the left lower abdominal quadrant, which increased in size during the period of observation. Death occurred following rupture of

a sac. There are said to be only 2 similar cases reported in the literature.

**TRAUMATIC** aneurysm of the **INTERNAL ILIAC** artery was recorded by W H C Romanis (*Lancet* 1 500 (Mar 9) 1929) in a patient with negative Wassermann reaction. The aneurysm followed a deep perineal operation with extensive plugging for an ischiorectal abscess. Romanis believed that the vessel had been injured or bruised during the operation.

**PLACENTAL**—Two cases of this condition are reported by O Hintze (*Zentralbl f Gynak* 52 2524 (Sept 29) 1928), the aneurysm in each case being about as large as a cherry, involving the artery that supplied the larger part of the placenta. Above the aneurysm, there was a sharp kink in the artery. In 1 case, there was a premature detachment of the placenta, and the child was born asphyxiated. The cause of the aneurysm is not explained. It was not syphilis. Rupture of an aneurysm of the placental artery is to be considered as a cause of intra-uterine death of the fetus.

**POPLITEAL**—The question as to whether a high **amputation** should be performed at once or a local operation upon the aneurysm first and an economical amputation done later if gangrene develop in a leg, the seat of popliteal aneurysm is discussed by D Petit-Dutaillis and D Théodoresco (*Presse méd* 36 497 (Apr 21) 1928). Gangrene may come about from aneurysm in 3 ways. By extensive thrombosis originating in the sac, by embolism, and by rupture of the aneurysm into the soft parts. The authors suggest that the formation of clots in an aneurysm may be due to latent



bacterial infection, which would account for the inflammatory reaction that often takes place around an aneurysm and the suppuration that sometimes occurs in the sac. In *gangrene* from embolism, conservative treatment is indicated. There is no necessity for immediate amputation as the gangrene is dry and not rapidly progressive, but the development of new emboli must be prevented by operation on the aneurysm. As the contents of the aneurysm may be of a bacterial nature, the operation should be a **resection of the sac**, which brings about, in the majority of cases, an effect similar to that of sympathectomy, *i e*, dilatation of the peripheral vessels which favors arrest of the gangrene. A case of *gangrene* of the right foot of a man 55 years of age, in which the sac was **extirpated** and a Pirogoff amputation was performed a month later, is reported. In cases of gangrene from rupture of the sac into the tissues, the rupture is generally not sudden and the hematoma around the aneurysm develops gradually. The authors report 8 cases in which resection of the sac was performed with 6 recoveries and 2 deaths. In the 2 fatal cases, the lesions were too far advanced for conservative operation. **Resection of the sac** is often indicated in this form of gangrene also, but the indications must be considered more carefully than in gangrene from embolism. In a large diffuse aneurysm of the popliteal artery treated by Boppe (Bull et mém Soc nat chir 54 1097 (Nov 3) 1928), the condition was caused by a laceration of the vessel by an exostosis on the femur. The arterial wound was exposed, the hematoma removed and the vessel **sutured** with

silk, followed by prompt and uncomplicated recovery.

**PULMONARY ARTERY**, diagnosed by x-ray during life, is reported by L Horn (Ztschr f Kreislaufforsch. 21 249 (May 1) 1929). The diagnosis could not have been made from clinical signs. The patient, a woman of 23, at first had a subfebrile rheumatic polyarthrititis with a systolic murmur transmitted into both carotids and heard in the interscapular space. The first diagnosis was mitral stenosis. Later, she again entered the hospital for palpitation and dyspnea on exertion, and the electrocardiogram showed a right-sided preponderance suggestive of pulmonary stenosis, but the x-ray examination revealed the pulmonary artery shadow to be broader than normal, and a pulsating, plum-sized dilatation of the left main branch. The second pulmonic sound had a thumping character. The patient later entered the hospital several times for dyspnea and slight cyanosis. Horn concludes the aneurysm was caused by an open ductus arteriosus, to which the murmur present at the first examination pointed.

**RENAL ARTERY**—In 2 cases recorded by H A Singer (Arch Path and Lab Med 5 223 (Feb) 1928), 1 was attributed to a primary degenerative lesion of non-specific character, involving the media and causing a weakening of the vessel walls. In the second case, aneurysm was favored by erosion of the renal artery by inflammation which had its seat in the fat at the hilum of the kidney. Singer believes that traumatism is responsible in 50 per cent of the reported cases. The injury may be subcutaneous or perforating, or even

an insignificant trauma, as a forceful bodily movement

In an arteriovenous aneurysm of the renal vessels with consequent asystole reported by M E Varela (*Rev méd latino-amer* 13 98 (Oct) 1928), a man aged 27, had cyanosis, edema, dyspnea, abdominal disturbances, enlargement of the liver and splenomegaly. A diagnosis of arteriovenous aneurysm was made from fremitus and a continuous murmur with a systolic reinforcement in the right lumbar region. Necropsy showed an arteriovenous aneurysm of the right renal artery. The heart, with normal valves and without signs of degeneration, was enlarged. The left kidney measured 15 by 9 centimeters. The author believes that a continuous murmur with systolic reinforcement is pathognomonic of arteriovenous aneurysm.

**SPLENIC ARTERY**—E L Hunt (*Am J M Sc* 176 195 (Aug) 1928) was able to collect but 45 cases of aneurysm of the splenic artery from the literature. In only 1 was the diagnosis made before death. The etiology is obscure. Syphilis is not a cause. Arteriosclerosis accounts for some, but 16 per cent of the 45 cases occurred in patients under 35 years of age. Sex and age are not important factors, and trauma is but rarely responsible for the condition. It has occurred as a complication of pregnancy in 3 or 4 of the 45 instances. The aneurysm is usually located in the main trunk of the splenic artery, very few occur in the branches. The symptoms are 6 in number. Abdominal pain, gastrointestinal hemorrhage, splenic tumor, tumor in the epigastrium pulsating with murmurs, anemia, and an x-ray

picture which rules out a tumor of the stomach. More than half of the cases have been associated with either gastro-intestinal or intraperitoneal hemorrhages. Pain is not constant, and the presence of a tumor is rare. Splenic aneurysm most frequently complicates endocarditis and hypertension. It rather rarely occurs in luetic cases. Hoegler diagnosed the condition correctly and operated and saved the patient. Davis, who had diagnosed a tumor, also operated with success. Smith diagnosed an ectopic pregnancy, the patient dying. Hunt's patient, a man aged 70 years, was brought into the hospital comatose with Cheyne-Stokes respirations, enlarged heart, left complete hemiplegia, and a ruptured aneurysm of the splenic artery was found at autopsy.

Goullioud (*Lyon méd* 142 353 (Sept 23) 1928) reports the case of a woman aged 70, from whom, 12 years ago, he removed an aneurysm of the splenic artery, the size of an orange. The patient still leads an active and vigorous life and enjoys good health. The author recommends simple **ablation** of the sac or ablation with **splenectomy**, depending upon the location and the attachment of the sac, or **ligation** of the trunk of the artery in its accessible portion, if one cannot do anything else. No trouble is to be expected from ligation of the splenic artery. **Removal of the sac** is indicated if adhesions to the pancreas do not prevent it. The spleen need not be removed, and if the sac cannot be extirpated, the splenic artery should be ligated. Aneurysm of the terminal portion of some of the branches of the artery is of more frequent occurrence and more difficult

to diagnose and treat. The tumor lies hidden in the hypochondrium and at first suggests enlargement of the spleen, especially Banti's disease. Pressure on the ureter may lead to hydronephrosis on the left side. In Goullioud's case, the aneurysm had been present for 4 or 5 years and had attained the size of an orange. It was at first thought to be a pancreatic cyst. With careful hemostasis, the adhesions were freed, the splenic artery was ligated proximally and distally, and the aneurysm delivered from the abdomen. **Splenectomy** in the treatment of aneurysm of the splenic artery was first proposed in 1905 by Winkler, who reported the first case successfully operated upon. In 1924, Baumgartner and Thomas were able to collect from the literature the reports of 40 clinically diagnosed cases. A third of the patients were between the ages of 25 and 40 years and 60 per cent were under 50 years of age. In a few instances the etiologic factors were syphilis, endocarditis, and trauma, but in the majority no cause could be discovered. Aneurysm of the middle portion of the artery lies on the upper surface of the pancreas and becomes more or less adherent to the organ. In a few of the reported cases, there were severe painful crises without fever or signs of peritonitis, but, as in the author's case, there may be no subjective symptoms. Auscultation of the lesion should lead to a diagnosis. The 1 typical characteristic of this type of aneurysm is the absence of findings suggesting involvement of the spleen. The condition progresses through 3 stages: (1) the stage of simple free enlargement, (2) the stage of the formation of adhesions,

and (3) the stage of rupture. The natural course of the condition is toward a fatal rupture into the peritoneal cavity, the stomach, or the colon. When rupture occurs, a ruptured tubal pregnancy or hemorrhage from a gastric ulcer may be suspected. Operative interference before rupture offers the only hope of cure. **Splenectomy** in 1 stage or following preliminary arterial ligation is indicated.

R. Remmelts (Zentralbl f Gynak 52 167 (Jan 21) 1928) had a patient die at the end of pregnancy with signs of internal bleeding as she was being prepared for laparotomy. The blood came from a ruptured aneurysm of the splenic artery.

**TUBERCULOUS** aneurysm of the hepatic artery occurred in a case of chronic tuberculosis of the abdomen. Death followed from hemorrhage as the result of rupture of the aneurysm. Tuberculosis of the pubic bone had been present 10 years before the onset of the acute symptoms (W. P. Thompson, Bull Johns Hopkins Hosp 42 113 (Mar) 1928).

R. B. Malcolm (Canad M A J 19 33 (July) 1928), in a case of tuberculous aneurysm found tubercle bacilli in the media of the arterial wall, indicating transmission of the infection through the vasa vasorum.

**ANGINA PECTORIS.** See **CARDIOVASCULAR SYSTEM**.

**ANGIONEUROTIC EDEMA.** See **EDEMA, ANGIONEUROTIC**.

**ANOSMIA.—ETIOLOGY.**—Sudden loss of sense of smell often occurs in ordinary "head colds," nasal diphtheria, and acute sinus disease, especially ethmoiditis, where the middle turbinates are sufficiently

swollen to cause pressure on the septum and interfere with ventilation in the olfactory fissure

Gradual loss of smell is found in the more chronic nasal affections, such as hypertrophic rhinitis, polypi, and tumor formation in the superior straits. It is also observed in noses that are crowded above the middle meatus, due to a thickened or deflected septum. In *atrophic* rhinitis, where the olfactory area in the nose is involved, the sense of smell is lost. Irritants such as sulphur, carbon, tobacco and frequent nasal douchings also play a rôle in the etiology of this affection. Syphilis, senile atrophy of the olfactory nerve, and injuries at the base of the skull anteriorly are other causative factors.

**TREATMENT.**—Anosmia due to mechanical disturbances in the nose is amenable to treatment. Surgical removal of the underlying nasal pathology relieves the trouble. Removal of causative irritants sometimes restores the sense of smell. Those causes that lie directly in the nervous system have a very bad prognosis.

Internally the administration of strychnine sulphate,  $\frac{1}{50}$  to  $\frac{1}{30}$  grain (0.0013 to 0.0022 Gm) or potassium iodide, 15 to 30 grains (1 to 2 Gm) is sometimes helpful —[ED]

**ANURIA —ETIOLOGY**—D N Eisendrath (Minnesota Med 11 449 (July) 1928) presents a comprehensive discussion of this important subject. He calls attention to the fact that in cases of oliguria or anuria, it should be remembered that the majority of anurias are due to some form of obstruction at the outlet of the renal pelvis or distal to it, a state of affairs demanding a urologic examination

immediately. In treatment, ureteral catheterization offers the best outlook in cases of obstructive anuria and should be given a trial of 48 hours but no longer. The author describes 5 cases in which the anuria was completely or temporarily relieved by ureteral catheterization.

That latent hemagglutinins may cause anuria is the opinion of G Shera (Brit M J 1 754 (May 5) 1928) who reports 1 case which terminated fatally. The urine became scanty and blood-stained on the day following a transfusion. Death was attributed to uremia due to mechanical blocking of the kidneys and liver by blood cell agglutination.

**TREATMENT**—*Calculous* anuria is discussed by G F Cahill and H H Gile (J A M A 91 1970 (Dec 22) 1928). The authors consider that **nephrotomy** is the treatment of choice, together with drainage through a lumbar incision, on both sides if necessary.

*Non-obstructive* suppression of urine is discussed by A A Osman (Lancet 2 1233 (Dec 15) 1928). Twenty-four cases of severe, partial or complete suppression of urine are reported. In summing up, the author thinks the essential points in the procedure of treatment are to give **alkalis** in increasing amounts rapidly until diuresis commences, then to reduce the dose sufficiently to maintain the flow, but not to the extent of causing a secondary decrease in the secretion.

In cases of *post-operative* retention of urine persisting more than 12 hours, E Fermaud (Rev méd de la Suisse Rom 48 212 (Mar 25) 1928) recommends the use of 10 c c ( $2\frac{1}{2}$  drams) of a solution of **glycerite of boro-glycerin** (1 part to 5 parts water) in-

jected into the bladder (full) If the glycerite boroglycerin content is less than 20 per cent, it has no effect, if it is greater, it irritates the bladder

O S Lowsley (J A M A 90 511 (Feb 18) 1928) reports and describes a new procedure by which 3 cases of *congenital* and 3 cases of *traumatic* incontinence of urine were cured In the **reconstruction of the sphincteric portion of the urethra**, this portion is made as small as possible, so that the muscles of the structure will have the greatest possible opportunity to become effective as a sphincter

**APPENDECTOMY.**—Appendectomy is perhaps the most common major operation performed in the average hospital In 1928 O W Niemeier (Canad M A J 21 390 (Oct) 1929) found that one-sixth of all the major operations performed in the Hamilton General Hospital (Ontario) were for appendicitis He reports 136 consecutive operations without mortality, 55 per cent of the patients came to operation within 24 hours of the onset of symptoms and 28 per cent after 48 hours In any case of abdominal pain, the importance of a routine rectal examination is stressed A *McBurney incision* is favored and if the appendix cannot be reached through the usual incision, it may be readily extended by a curved or hockey-stick incision of the sheath of the rectus, exposing the rectus muscle, the internal oblique and transversalis, which are retracted, and the peritoneum divided along a curved line, which is carried downward through the rectus as far as is necessary

The influence of appendectomy upon the gastric secretion was studied

by Evoján (Nov Chir Arch 15 12, 1928) by examining the gastric juice before and after appendectomy in 190 cases The examinations were made in a 10-day interval and over a period of 6 months The patients were males varying in age from 18 to 55 years One hundred and fifty-five had chronic appendicitis, 27 subacute appendicitis, and 7 acute appendicitis with a plastic exudate In 13 of the 155 cases of chronic appendicitis a microscopic examination showed the appendix to be normal Seventy-five per cent of the cases of removal of a pathological or normal appendix were followed by a decrease in the acidity of the gastric juice, regardless as to whether it was high, normal or reduced before the operation In a large number, this reduction of acidity persisted for at least 6 months The method of operation apparently played no part in the change The cause is ascribed to the removal of the mucosa, this being the only layer of the wall which was removed in all cases, especially the removal of the cells of Masson in the Lieberkuehn glands of the appendix It is possible that these cells have an effect on the secretory and motor functions of the stomach which explains why the acidity is nearly always increased in hyperplasia of the argentaffin cells and decreased after appendectomy

*Drainage* in operating for an acute appendicitis is used much less often than formerly Drainage is not required because the appendix is acutely gangrenous or because there is a quantity of sero-pus in the abdominal cavity Only when solid or semi-necrotic material is left within the cavity, is drainage necessary The extensive drains formerly used, which

ran between intestinal coils and were carried to the bottom of the pelvis, have been found by many surgeons to do more harm than good. With shorter incisions and less intra-abdominal manipulation and packing, secondary complications have largely diminished. A drain left for a prolonged period of time may ulcerate into an adjacent viscus. Viannay (Bull et mém Soc nat de chir 55 303, 1929) reports 2 cases of ulceration of the external iliac artery caused by a drain after an operation for acute appendicitis. The first patient was a girl of 16 years who, for a purulent collection in the pouch of Douglas, had a large drain surrounded by 2 tents introduced to the bottom of the pelvis. Nine days after the operation, hemorrhage occurred from ulceration of the external iliac arteries, where it had been in contact with the drain. The artery was ligated above and below the ulceration, the patient dying the same night. The second patient was also a young girl who had an abscess in the right iliac fossa after utero-adnexal infection which followed an attempted abortion. The abscess was incised and a drain introduced. A week later, hemorrhage occurred as the result of contact of the drain with an artery, the patient dying on the way to the operating room. Fever following appendectomy is always significant and often hard to explain.

A persistent typhoid-like fever after appendectomy is reported by N. Danbolt (Norsk mag f laegevidensk 90 1052 (Oct) 1929) which was attributed to the *Bacillus fecalis-alcaligenes*. This was agglutinated in the patient's serum, in a dilution of 1:80, the titer falling to zero when convalescence set in.

### APPENDICITIS. — ACUTE. —

The problem of the fixed or even ascending mortality rates in acute appendicitis engages the thought of surgeons the world over. The anticipated reduction in mortality by improvements in technic developed through surgical experience have not been fully realized, and intensive studies of etiology, diagnosis, technic of operative attack and details of post-operative procedure have been made in the search for clues to possible means of improvement.

**ETIOLOGY**—Little is gained in the study of direct etiology save that in a small number of cases traumatism appears to have been definitely proven as responsible, A. H. Bissel (Arch Surg 17 672 (Oct) 1928). This makes necessary the consideration of the possibilities of appendicitis where the traumatism has been well localized and of considerable violence, and has been soon followed by suggestive symptoms. But case analysis, almost without exception, shows the existence of predisposing factors in the shape of fecaliths, kinks or limiting adhesions. J. Lévai (Zentralbl f Chir 55 3019 (Dec 1) 1928) "is convinced after a review of 1054 cases that with a normally situated, freely movable, healthy appendix, trauma never leads to inflammation."

Study of the bacterial etiology, and what may be termed the epidemiology, shows a definite increase in the disease during epidemics of respiratory infections, J. Brennemann (J A M A 89 2183 (Dec 24) 1927), of the University of Wisconsin clinic for students, showing 113 cases of appendicitis in 226 of what might be termed respiratory-epidemic days, while a similar 113 cases developed

in 1600 non-epidemic days This emphasizes the necessity of critical consideration of all abdominal discomforts developing during acute infections of the upper respiratory tract

The reports of the actual bacterial contents of the removed organs are by no means consistent R Hilgermann and W Pohl (Deutsche med Wchnschr 55 1161 (July 12) 1929), in a study of 320 cases, conclude that the disease is caused by a group of virulent bacteria not belonging to the normal intestinal flora, while at the same time stating that the organisms responsible vary in different geographic areas Lohr and Rosenfeld (Zentralbl f Chir 55 2871, 1928) on exhaustive study of their material, for aerobic and anaerobic organisms state that the same flora were present in normal appendices and assign the final responsibility for the development of disease to unfavorable mechanical conditions, interfering with drainage, which hold necrosis-producing toxins under pressure within the lumen

Similar findings are the basis for the advocacy of the use of polyvalent anti-gangrenous serum as an adjuvant measure of therapy by M Weinberg, A R Prévot, J Davesne and C Renard (Ann de l'Inst Pasteur 42 1167 (Oct) 1928) He especially holds the association of *B coli* and *B perfringens* as common and dangerous Comparative figures are not given

**DIAGNOSIS**—Since prompt recognition of the malady is of prime importance, attention has been directed to atypical chronologic development of symptoms and clinical signs at different age periods, and also to the

aggravation of the disease by the use of purgatives H A Bruce (Canad M. A J 19 38 (July) 1928) particularly speaks of the limitation of the rigidity in children, and H Lehmann (Wien klin Wchnschr. 40 995 (Aug 4) 1927) draws attention to a similar condition in the aged, where muscular atony and flaccidity prevent the development of marked tension In these 2 age extremes, then, *localized tenderness* assumes increased importance in diagnostic value Deaver regards the pelvic situation of the acute appendix as most frequently responsible for the atypical localization of pain and tenderness nearer the midline and to the left of it, and stresses the importance of the rectal examination

In *differential diagnosis* the confusing diseases can be divided into one group, the identity recognizable by careful and complete examination—such as epididymitis J Baumann (Med Welt 2 872 (June 9) 1928) indicates the need of complete urogenital examination in right-sided pain A second group comprises intra-abdominal accidents and emergencies of widely varying pathology—such as torsion of the omentum (E Hegge Norsk Mag Laegevidensk (Apr) 1929), acute hemorrhagic epiploites (H Schomberg Beitr z klin chir 146 89, 1929), ovarian hemorrhage (R K Wilson Lancet 1 1221 (June 16) 1928), besides the other diseases commonly considered in differentiation The essential factor of safety in such conditions is the early recognition of the “acute abdomen” and prompt surgical intervention

**TREATMENT**—In operative procedures in the acute cases discussion continues over the advisability of im-

mediate operation in *all* cases Deaver (J A M A 90 1679 May 26) 1928) recognizes a group of acutely ill where he believes temporary delay to favor localization is advisable—this is the group presenting a clinical picture of diffuse peritonitis B C Willis (South Med J 21 622 (Aug) 1928), presents a large series of perforative cases, operation having been done immediately, with a mortality of 6 per cent R M Harbin (Med J and Rec 130 32 (July 3) 1929), E P Quain and R H Waldschmidt (Arch Surg 16 868 (Apr) 1928), H H Rayner (Brit M J 1 706 (Apr 28) 1928), E L Eliason and L K Ferguson (Ann Surg 88 65 (July) 1928) all present large series of immediate operations the end-results of which cast doubt on the wisdom of delay at any time unless the patient be in the condition described by Eliason “as where distension overshadows rigidity, cold extremities and silent abdomen”

F W Bancroft (S Clin North America 8 977 (Oct) 1928) speaks favorably of **jejunostomy**, as do also E P Quain and R H Waldschmidt (*loc cit*) in cases of diffuse peritonitis The latter, indeed, suggest **appendicostomy** where there is threat of distension, though diffuse peritonitis is not immediately present

W M Weeden (Ann Surg 88 76 (July) 1928) recommends the Gibson modification of the Mikulicz **drain** in those cases of widespread peritonitis where wound suture is not done, claiming that toxemia is quickly relieved, abdominal wall necrosis lessened, formation of firm adhesions avoided and pain on drain removal much reduced by its use A mortality of 12 per cent is recorded

*In Pregnancy*—It has long been noted that the danger of appendicitis is markedly increased by an associated pregnancy H Dworzak (Med Klin 25 1245 (Aug 9) 1929) has reviewed the literature as to treatment of acute appendicitis during pregnancy and reports 4 cases from his own observation Up to the fourth month, acute appendicitis should be treated in the usual manner Appendicitis is not an indication for the interruption in pregnancy In the more advanced stages of gravidity, the earlier the operation is performed the better will be the result and the less the danger of premature birth or abortion If perforation and perityphlitic abscess exist and labor pains have not begun, the **abscess** should be incised and drained Whenever the appendix can be reached easily, **appendectomy** may also be done, but the gravid uterus should not be disturbed If the appendix cannot be removed at this time, it should be removed later If at the time of operation, labor pains have already begun, it is advisable that after the operation the birth should be left to advance in the normal way However, if the process is too slow, and if the condition of the mother necessitates a more rapid delivery, **celiotomy** may be done The abdomen is then closed provisionally, the confinement is completed by vaginal section, and after that the abdomen is again inspected and drained

Obviously, as A L McDonald writes (Am J Obst and Gynec 18 110 (July) 1929), a Cesarean section combined with appendectomy is not an appropriate treatment for appendicitis during pregnancy, as an acute peritonitis presents a most unfavorable field for hysterotomy Abortion



or labor gives a relatively grave prognosis. Obstetric procedures are indicated only when either event is actually impending and the delivery should be completed by the most conservative methods consistent with good practice.

#### CHRONIC APPENDICITIS.—

**DIAGNOSIS**—Controversy still waxes warm about the existence of chronic appendicitis. H. W. Bettmann (*Ann Int Med* 2:509 (Dec.) 1928) states that when there is no history of a preceding attack of acute appendicitis, and when the main clinical symptom is distress in the right lower quadrant, operation is almost sure to fail to give relief. If judged by the clinical results, the operations for chronic appendicitis are disappointing in 40 per cent of the cases.

It is evident that no uniformity exists as to the ideas of the etiology of the condition, or to the expression of its existence in symptomatology. A. J. Walton (*Brit M J* 2:1068 (Dec. 10) 1927) states that chronic appendicitis is not a primary disease, it occurs only after an acute attack. J. B. Deaver (*A J M Sc* 177:749 (June) 1929), however, finds that chronic appendicitis frequently comes on insidiously without pain, but with more or less indigestion and abdominal discomfort. Not all chronic appendices are the result of a previous acute attack. V. Bonney (*Brit M J* 2:1066 (Dec. 10) 1927) and W. Trotter (*ibid* 1063), W. J. Dowden (*ibid* 1066) and A. J. Walton (*ibid* 1068), in a symposium on chronic appendicitis, by their formidable list of conditions mentioned for consideration in differential diagnosis, emphasize the pitfalls when a diagnosis is made in haste without a painstaking study of

the patient and operation performed immediately.

In *children* also the diagnosis is one beset with uncertainties as shown by R. Hutchison, A. J. Walton, *et al* (*Proc Roy Soc Med* 21:99 (Apr.) 1928).

It would be well nigh impossible for an under-graduate in medicine to obtain from the writings of the last 2 years a mental picture of chronic appendicitis, having any degree of clearness. If disappointments are to be avoided for operator and patient the diagnosis is to be made only after prolonged observation and study, and even then with hesitation. Where there is definite history of a previous attack there need be little discussion usually. Where such is not the case, frank acknowledgment to ourselves that the operative procedure is exploratory in nature is the fairest and safest attitude to assume. If full pre-operative histories are kept and prolonged "follow-ups" used as checks, in cases where appendectomy only has been done, and where no other pathology has been noted after reasonable exploration, there may eventually be accumulated enough data on which to base reliable diagnostic criteria.

**APPENDICITIS IN CHILDREN.**—In the operation for acute appendicitis in children, E. Flusser, (*Munchen med Wchnschr* 76:1542, 1929) frequently noticed adhesions and other evidence of previous chronic infection. In a search through the histories of these patients for the early symptoms of the disease, he could find no uniformity of complaints. A frequent desire to defecate or to urinate occurred in some

instances, other children had loss of appetite, vomiting spells, and attacks of "colic" with pain about the umbilicus. Limping with the right leg with no evidence of bone or joint disease was observed in association with appendicitis in a few patients. The writer believes that a careful examination of the region of the appendix is the best aid to diagnosis although the classical sign of rigidity may be obscured by crying and the sign of tenderness by indefinite localization of pain.

Errors in diagnosis were responsible for one-third of the deaths from appendicitis in a series of 1056 patients operated by E. Monnier (*Schweiz med Wchnschr* 58:697 (July 14) 1928). There was a total of 55 deaths due always to rupture of the appendix and subsequent peritonitis. In one-half of this number the physician had been called too late but the remainder were errors of diagnosis due frequently to abnormal locations of the appendix, either in a retrocecal position or in the pelvis. Monnier urged early operation in doubtful cases.

A. H. Montgomery (*S Clin North America* 9:367 (Apr) 1929) stresses the importance of making an early diagnosis of appendicitis but acknowledges that the 2 most important clinical signs, local tenderness and rigidity, are difficult to elicit in young patients. However, unless these signs are present, one should look elsewhere for the diagnosis. He cited 5 instances of children who had symptoms suggestive of appendicitis, but subsequent examination indicated that 1 had pyelitis, another lobar pneumonia, the third hemorrhagic purpura, the fourth an osteomyelitis

of the acetabulum and the fifth probably a retro-peritoneal lymphadenitis.

There was no mortality from chronic appendicitis among the statistics reported by C. E. Farr (*Arch Pediat* 46:335 (June) 1929). In a series of 1459 appendectomies in children, about 6 per cent of those with acute infections died. In children under 5 years of age, the mortality may be as high as 13 per cent. He attributed this to a decreased resistance to infection among infants and to a certain number of congenital abnormalities of structure and position of the appendix, and to the difficulty of making an early diagnosis. E. W. Peterson (*Ann Surg* 89:48 (Jan) 1929) made a careful review of 100 appendectomies performed by himself in children under 7 years of age. Six patients died, all of them 3 years of age or older. He found intussusception associated with appendicitis in 10 children, 8 of whom were less than a year old. In his opinion, appendicitis was the cause of the invagination of the intestines in these instances. Appendicitis also occurred in several patients with right inguinal hernias. According to the writer, this condition should always be suspected in hernias of long duration and when pain is associated with a hernia of the right side.

Patients with chronic appendicitis also had associated tonsillitis in 1 instance, tuberculous mesenteric lymphadenitis in 3, and pinworm infestation of the appendix in 2.

In a list of conditions with which appendicitis may be confused, Peterson included gastro-enteritis, acute right-sided pyelitis, Henoch's purpura, intussusception, mesenteric lymphadenitis, peritonitis from other causes,

inflamed Meckel's diverticulum, stone in the right ureter, pelvic disease in females, the complications of an undescended right testicle, duodenal ulcer, psoas abscess, infections of the right hip joint, acute infectious diseases and tonsillitis

**APPENDIX.—STRANGULATION**—Strangulation of the appendix in a sac of an inguinal or femoral hernia is occasionally observed. J Murard (Bull et mém Soc nat de chir 55 890 (June 29) 1929) reports the case of a girl, aged 18, and a boy, aged 9, who had strangulation of the appendix in a paracecal fossa. In both the onset of symptoms consisted of acute pain in the right side of the abdomen, without rise in temperature or vomiting. In the girl, further attacks of pain and slight rise in temperature led to an appendectomy. In the boy, the temperature remained normal throughout, but vomiting and diarrhea developed, with increasing tenderness of the abdomen. In both patients the appendix was slightly discolored and somewhat enlarged, but otherwise presented no pathological alteration.

**ARSENIC.—ELIMINATION**—Arsenic may be found in the excretions of many individuals without discoverable cause and without giving rise to symptoms. In a series of 100 cases studied by K Vogel (Am J M Sc 176 215 (Aug) 1928), tests for arsenic were carried out during a period of approximately 3 years. In this series 240 tests were made, 135 times on the urine, 62 times on the stool, and in the remaining instances, on spinal fluid, vomitus, skin and liver. Of the 100 patients, 69 showed arsenic in the excretions. In 34 of the positive tests, this was to be expected, since arsenic had been administered in some form or another. In the remaining 35 cases no ascertainable cause for the entry of arsenic

into the body could be found. In 40 cases, jaundice was a symptom, and in only 6 of these no arsenic was detected. It is the liver that bears the brunt of the arsenic damage, followed in order, by the kidneys, spleen, and intestines. Obregia and Carniol detected arsenic in the bile 25 minutes after the intravenous administration of neosalvarsan, and Frenkel-Heiden and Navassart found the elimination of arsenic in the feces about 8 times as great as in the urine, presumably through resorption from the bile. The liver cells, therefore, are especially exposed to injury by arsenic. It is recognized that a synergistic action of 2 or more agencies may be at hand to produce certain forms of parenchymatous damage. Toxic agencies like alcohol, tobacco, copper, arsenic, syphilis, infection, when 2 or more of them are co-existent, may be followed by tissue changes which could be withstood if only a single factor were at work. For example, in alcoholic hepatic cirrhosis jaundice is more likely to develop when arsenic is introduced into the body than when no such cirrhosis exists. Many are the sources from which the man in the street may acquire arsenic. The air, water supplies, dust, oil, food, drugs and articles of wearing apparel and household use are all potential sources of arsenic poisoning. In 9 out of 34 cases in which arsenic and jaundice occurred simultaneously, death resulted. In 4 of these cases death promptly followed an operation on the biliary tract. If arsenic is found in the urine of a patient with jaundice, eliminative treatment with thiosulphate should be carried out before operation.

**POISONING**—G Liebermeister (Mun-chen med Wchnschr 76 668 (Apr 19) 1929) reports on 50 factory workers who were treated for acute poisoning. It was detected that the water used to prepare coffee had been contaminated. In 100 c.c. (3½ ounces) of water, 0.346 Gm (5½ grains) of arsenic was found. The treatment consisted of stomach lavage, followed by ingestion of milk and chalk powder. Most of the patients were cured in 3 days. The surprising fact that such large quantities of poison did not cause death is explained by the author as being due to the fact that the poison was ingested in a dissolved form. In poisoning with solid ar-

senic, irrigations do not remove all of the poison, which may be retained in the folds of the stomach

R Y Wheelihan (Am J Dis Child 35 1032 (June) 1928) reports a case in a child of 9 with high fever, enlarged liver and spleen, lesions in the mouth, and a granulocytic aplasia. It was found that the child had taken over a long period of time, 6 grains (0.39 Gm) of arsenic trioxide. Recovery followed.

#### TREATMENT OF POISONING—

W R Bond and E W Gray (J A M A 92 1919 (June 8) 1929) recommend primarily gastric lavage in acute arsenical poisoning. Sodium hydrosulphite may prove quite effective, particularly in those cases in which the presence of undigested food in the stomach might embarrass the progress of lavage. It may serve to fix or render unabsorbable the arsenic until thorough lavage can be effected.

**ARTHRITIS** — R Pemberton (Am J M Sc 178 593 (Nov) 1929) reports the rather startling incidence of rheumatoid arthritis in Berlin alone as 3.4 times as great as tuberculosis. Enormous sums of money are being expended by insurance companies and specialized institutions to combat this condition. Even special hospitals are being erected. The American Committee for the Study of Arthritis has decided to classify all cases of arthritis exclusive of tuberculous as (1) atrophic and (2) hypertrophic.

**PATHOLOGY** — Pathologically, the atrophic type shows smothering and destruction of the cartilage by an overgrowth of the synovial membrane with a destructive growth of the granulation tissue from the bone below. In the hypertrophic type, we see fibrillary degeneration of the cartilage with an overgrowth of the bone at the margin of the joints and elsewhere.

**ETIOLOGY.**—Although many observers have accepted the problem of

focal infection as the etiological factor in arthritis, the American Committee for its study recognizes an underlying cause in the background, determined by heredity, constitutional makeup, equilibrium of the nervous system, chemical and other toxins of an imponderable nature and finally many conditions of environment.

In addition to the above broad statement, we must seriously consider the bacteriologic, physiologic and endocrinologic factors in the etiology. Peirce and Pemberton have found in a study of 1100 cases that arthritis is twice as frequent in women as in men, that the knee is the site of greatest incidence, the fingers next and that heredity was an important factor in 60 per cent of the cases.

J A Corscaden (Am J Roentgen 19 321 (Apr) 1928) has studied the effect of artificial menopause induced by the use of radium and believes it has very little relation to arthritis.

On the other hand, J Ratner (Mitt a d Grenzgeb d Med u Chir 41 201, 1929) cites several cases, particularly of spondylitis deformans, in which he believes an endocrine imbalance is the sole cause. Walther Muller (Beitr z klin Chir 143 137, 1928) believes unquestionably that a reaction exists between the endocrine and articular systems. He subdivides those cases of ovarian origin into 3 groups (1) at the onset of the menopause, (2) in premature involutions of the ovaries and (3) in artificially induced amenorrhea.

R L Jeffery (Northwest Med 27 275 (June) 1928), although he had gratifying results with thyroid and ovarian therapy, questions the value

of these preparations as a substitution for the actual deficiency, or as a stimulant to increase the resistance of the body to infections present therein. He has obtained smears and cultures from every possible source of infection and it is surprising with what frequency the *streptococcus non-hemolyticus* or *viridans* has been found. For a culture medium, he used the patient's serum.

G L K Pringle (Brit M J 1 751 (May 5) 1928) suggests the amelioration of arthritic symptoms during pregnancy as a result of the corpus luteum's inhibitory action on the posterior pituitary gland and the stimulation of thyroid activity.

Experimentally, J A Freiberg (Arch Surg 18 645 (Feb) 1929) has produced an arthritis in rabbits by repeated injections of a bacterial extract. This arthritis he believes is the result of an allergic factor.

**TREATMENT**—Pemberton (*loc cit*) advises in addition to the usual search for and a clearing of the foci of infection, the appreciation of the factor of deranged physiology present in all arthritic cases. Obtaining and maintaining their physiologic balance, he believes is best accomplished by means of systematic rest. Many observers of arthritis believe rest for an atrophic joint is undesirable but for a hypertrophic joint is highly efficacious. **Physiotherapy** involves the use of heat and massage, which the profession as a whole is just beginning to appreciate. Enthusiasm is prevalent for the allergic conception of the etiology of arthritis. **Non-specific protein therapy** is of limited value. It aids by increasing the general metabolism of the body. Considerable importance is given by Pemberton (*loc cit*) to the

gastro-intestinal tract and its tributaries or accessory passages. In the field of drug therapy, the outlook is limited. Of course the salicylates in their various forms relieve pain, but this is a temporary effect and it has its undesirable consequences. **Arsenic** with its influence on the hemopoietic system is of some value. According to Pemberton, **orthoiodoxybenzoic acid** had a recent vogue as a glorified salicylate, but it has not justified the claims of some writers.

For the *purulent* cases of *arthritis*, D. B. Phemister (Pennsylvania M J. 32 52 (Nov) 1928) advises **drainage, rest and weight extension**. He believes sequels should be treated by **prevention of joint contractures**, and **active use of the parts** after subsidence of the inflammatory process. Baking, massage, diathermy and passive motion are rarely of much benefit and osteotomy and arthroplasty should not be attempted until months after all inflammation has ceased.

P B Steele (Am J Surg 6 805 (June) 1929) takes the rather radical view that immediate **active motion** of the purulent arthritic joint should be instituted as soon as the drainage of the purulent material has started.

V Coates and J L Delicati (Lancet 1 609 (May 26) 1928) believe many cases of *infective arthritis* with a moderate to severe secondary anemia are markedly benefited by the use of liver. The improvement is not only in the blood count but also in the arthritic joints.

V Coates (Practitioner 121 391 (Dec) 1928) believes there is no standard diet for infective arthritis. Generous protein is allowed and is even advisable provided renal efficiency is satisfactory. Carbohydrate

may be normal or increased providing obesity is not a factor. An increase in the amount of fat in the diet is particularly advisable in the atrophic form of infective arthritis.

Payr (Ztschr f klin Med 108 4 (May 21) 1928) advises **synovectomy** in certain forms of infective arthritis of the *knee*. In the *hip*, instillation of **phenolated camphor solution** in the capsule is his procedure followed by the application of **apparatus** to relieve the weight of the extremity.

Although W M Bartlett and E Suneson (New England J Med 200 375 (Feb 21) 1929) advises the principles of **eradication of foci of infection**, active motion of the joints and vigorous and deep muscle **massage**, he does not believe the salts of **orthoiodoxybenzoic acid** to be curative. They relieve pain and muscle spasm in the majority of cases but are not curative. Good results have been obtained in unknown types, also in rheumatic and gonorrheal types with **orthoiodoxybenzoic acid** by A G Young (New England J Med 199 1194 (Dec 13) 1928). He used the oral, rectal and intravenous routes.

B F Smith (Texas State J Med 24 693 (Feb) 1929) gives the drug intravenously in 1 Gm (15 grain) doses semi-weekly. It is prepared by dissolving it in sterile distilled water without heat. The reaction may vary from a burning of the tongue and buccal mucous membrane, lacrimation and nausea to prostration and cardiac depression.

Swain (J A M A 93 259 (July 27) 1929) reports the value of **thyroid extract** to improve circulation, muscle tone, weight and vitality. F H Ewerhardt (J Missouri M A 26 7 (Jan) 1929) advises **galvanic** or

**alternating current** and **diathermy**. The **radiant lamp** and **infra-red ray** will relieve deep seated congestion and pain. W Ponndorf (Munchen med Wchnschr 75 1453 (Aug 24) 1928) treated 2450 cases with **lymph** prepared from staphylococci and streptococci found in the blood plus **tuberculin** and **tubercle bacilli toxins**, on the principle that severe tuberculosis and arthritis are mutually exclusive. In 58 per cent of cases he discovered a staphylococcic and streptococcic infection preceded the arthritis.

F C Hall (Am Med 35 367 (June) 1929) sums up the treatment of arthritis in the following: (1) **care of foci of infection**, (2) **rest** in large amounts, (3) a complete and high **vitamin diet**, (4) **correction of bad posture or incorrect body mechanics**, (5) **correction of endocrine deficiencies**, (6) **relief of constipation**, and (7) an abundance of **sunshine**.

### ARTHRITIS DEFORMANS.—

W S Baer (J M A Georgia 18 393 (Sept) 1929) divides arthritis deformans into 3 classes: (1) **infectious**, (2) **atrophic**, and (3) **hypertrophic**. Of the infectious type, he states, we find it in children in the form of *Still's disease* and he believes that this type is most prevalent at puberty.

**DIAGNOSIS.**—There is an increase in the fluid in the knee-joint, a round cell infiltration of the capsule, a hypertrophy of the synovium and fibrin formation in the joint. Naturally it becomes swollen as the result of the fluid. It is the typical picture of a disease coming on primarily in young people and generally preceded by an acute infection. When the involvement begins in the hand, it invariably affects the middle pha-

langeal joint The blood shows few changes except for a slight leukocytosis An x-ray of the joint shows fluid plus shadows from synovial thickening

**ETIOLOGY.**—The opinion of Baer (*ibid*) as to the etiology of arthritis deformans is confirmed by A Gibson (J Bone and Joint Surg. 10 747 (Oct) 1928) while M J Rowlands (Proc Roy Soc. Med (Sect Compar Med) 20 41 (Sept) 1927) believes the invasion of the body by infectious processes is accelerated by a vitamin deficient diet particularly vitamin B

**TREATMENT.**—The treatment is aimed at stopping the infectious process Etiologically some form of streptococcus has received the most blame Evidence is growing that it is probably some form of the non-hemolytic group Foci of infection may be found in the ethmoids, the tonsils, sphenoids, teeth, middle ear, chest, gall-bladder, appendix, gastrointestinal tract, kidneys, tubes or bladder

Baer (*loc cit*) believes in addition to the infectious process, there is something else which he calls "X" necessary for the development of arthritis This he claims is probably a hereditary factor Following the eradication of foci of infection, he advises the preparation of vaccines preferably from a lymph node in the region of the involved joint He starts the vaccine therapy with 0.1 c.c. of a 100,000,000 solution of bacteria followed by 0.2 c.c. in 4 days, 0.3 c.c. in 8 days, and so on for 12 to 15 doses A rest period of 6 weeks should be followed by a second series of injections

Some men have treated *osteoarticu-*

*lar tuberculosis* by artificial ankylosis. C Habler and N Weitzenfeld (Deut. med. Wchnschr. 54 566 (Apr. 6) 1928) gave intramuscularly a suspension of sulphur. In several cases it was successful especially when combined with non-specific protein therapy.

**ASTHMA.—TYPES.**—F Coke (Practitioner 123 73 (July) 1929) enumerates the types of asthma as (1) the sensitive type, the patient who has asthma during the hay-fever season, (2) the type with enlarged tonsils, (3) the week-end type, (4) the aspirin-sensitive type, (5) the reflex type, (6) the bronchitic type, (7) the colloid-classic type, who have usually received an injection of antidiphtheritic serum, (8) the menstrual type, (9) the periodic type and (10) a miscellaneous group

R Hutchison (Brit M J 1 783 (Apr. 30) 1927) describes 4 types of asthma in childhood (1) the spasmodic type, (2) the hay-fever type, (3) bronchial asthma and (4) the bronchitic type seen in babies distinguished from bronchitis by the sudden onset and subsidence, development of dyspnea before physical signs appear in the chest, absence of fever and presence of eosinophilia

**ETIOLOGY**—E Thonnard-Neumann (Arch f Schiffs-u Tropen-Hyg 32 358 (July) 1928) reports from Haiti an association between asthma and malaria In a study of 21 cases of asthma, he found they fell into 2 classes, (1) those having malaria in addition in which specific treatment for the malaria had no effect on the asthma and (2) a group in which the treatment of the malaria resulted in a cure of the asthma.

C A Elliott (Am J Surg 7 333 (Sept) 1929) has found a relationship between asthma and *hyperthyroidism* and states that 2 of his patients had marked relief from asthma following a **partial thyroidectomy**.

The mode of entrance into the body of the anaphylactogen in any type of hypersensitiveness is considered manifold by G Melli (Riforma méd 44 582 (May 14) 1928). He enumerates the various modes of entrance but states that in the majority of cases those of so-called *alimentary* asthma are in reality *inhalation* in origin.

R M Balyeat (J Lab and Clin Med 13 516 (Mar) 1928) relates many instances where orris root and the oil is the offending factor in causing both asthma and hay-fever. The basis of a large number of face powders, packs, astringent packs, bath salts, powders and soaps is orris root. His method of desensitization is similar to that used in the case of pollens and he reports satisfactory results.

In a study of 160 cases of asthma by A T Henderson (J State Med 36 683 (Dec) 1928), he reports positive reactions to feathers in 53 per cent of cases, to cat hair in 38 per cent, to horse dander in 36 per cent, to dog hair in 26 per cent, to sheep's wool, rabbit and cattle hairs in 18 per cent, 9 per cent reacted positively to orris root and 29 per cent to pollens. Of the foods, grains were the most important as wheat showed 40 per cent, oats 13 per cent, rice 10 per cent, barley 9 per cent, corn 4 per cent and rye 3 per cent. Vegetables gave the following reaction: tomatoes 15 per cent, potato 12 per cent., celery 12 per cent, bean 10 per

cent, pears 8 per cent. Of animal and fish foods, lactalbumin was positive in 12 per cent, casein in 3 per cent, chicken in 2 per cent, and haddock, mackerel and salmon in 4 per cent.

M B Cohen (J Lab and Clin Med 14 837 (June) 1929) lays particular stress upon *household dust* as an etiologic factor. To him 3 main sources of dust are available in the house, (1) the vacuum cleaner, (2) overstuffed furniture, and (3) the mattresses. To overcome the dust of the latter, he advises the use of rubber sheeting or Dupont's satin abricoid.

G M Schpoliansky (Monatschr f Geburtsh u Gynak 78 260 (Mar) 1928) studied the association of *pregnancy* with asthma. He used **calcium chloride** intravenously having found that his few cases consistently showed a low blood calcium. His results in some cases were gratifying, while in others they were unsuccessful.

I C Walker and J Adkinson (Arch Int Med 41 601 (Apr) 1928) have made a study of the bacteriology of 724 washed specimens of sputum from the bronchi of asthmatics. The predominating organisms are the hemolytic and non-hemolytic streptococcus in many groups and forms. With the exception of the *Staphylococcus pyogenes aureus*, occasionally found in large numbers, no other organisms predominate the sputum in comparison to the streptococcus group.

In a series of 167 cases, L H Crip and W S McElroy (Arch Int Med 42 865 (Dec) 1928) have attempted to discover an association between allergic conditions and the blood calcium. All cases of asthma do not show a lowered blood calcium and those which do so are not materially



benefited by the administration of this element.

W E Dixon (Practitioner 123 35 (July) 1929), from experimental work, has observed that anatomically the mucous membrane of the bronchial tree is so thin and avascular that engorgement and edema could hardly cause the constriction of the bronchi resulting in the dyspnea so characteristic of asthma. To him the evidence shows that practically all cases of asthma are due to a reflex stimulation of the medulla with a circulating poison so specific in nature that it affects the vagal system and allows its action to predominate over that of the sympathetic system.

J Freeman (*ibid* 123 43 (July) 1929) draws a close analogy between asthma and tissue reaction. He points out the similarity of the skin sensitization tests and the principle of dermatographia. He believes that to accurately judge the presence of either we must subtract the changes incident to the other. Symptoms at the point of contact with the protein call to his mind many concrete examples. He has frequently observed the result of a large dose of pollen hypodermatically in the creation of a sensitive area of skin or mucous membrane on which previous trauma had occurred. Eczema frequently attacks these areas of the skin which are exposed to the wind, washing and sweating. The active form of eczema is clearly traumatic in localization. Again angioneurotic edema appears to be a product of sensitivity plus repeated trauma. Paroxysmal arthritis frequently follows a blow to the joint but an asthmatic relationship can frequently be found.

A F Hurst (*ibid* 123 4 (July)

1929) believes the slight variation in the chemical constituents of the body fluids in the asthmatic influences the balance between the vagal and sympathetic components of the respiratory center, allowing the former to predominate and result in a bronchial constriction. Oriel, at Guy's Hospital, has shown a variation of the blood chemistry even between the attacks in asthma. There is believed to be a depletion of the endogenous supply of adrenalin and in many instances a hypoglycemia has been observed. To Hurst, the psychological factor in asthma is expectation, many attacks occurring as a result of auto-suggestion, all chemical and reflex influences having been eliminated.

W Willcox (*ibid* 123:13 (July) 1929) considers the etiology of asthma as a problem of discovering the occult sepsis. He enumerates many of these foci as the following (1) nasopharynx, (2) teeth, (3) urogenital tract and (4) intestinal tract.

A Francis (*ibid* 123 68 (July) 1929) reviews the innumerable conceptions of the etiology of asthma and finally adds his opinion that it is not a disease entity, but simply a symptom of vasomotor instability. After the local treatments to many areas of the mucous membrane, particularly in the nose because of its accessibility, many cases have a substantial systolic blood-pressure and a stabilizing of their vasomotor system, 2 factors greatly influencing the treatment and prognosis of asthma.

**SYMPTOMS.**—K Stolte (Jahrb f Kinderh 122 1 (Nov) 1928) describes the symptoms of asthma in children as extreme dyspnea with unilateral or bilateral pulmonary emphysema, contraction of all acces-

sory muscles of inspiration, inability to completely expire, cyanosis of the lips and nails, grayish pale complexion and restlessness in the beginning of the attack. He reports cases of asthma in infants from 6 to 8 weeks of age.

**TREATMENT.**—At the present time, we would hardly dare say the treatment of asthma is in any way a standardized or universally dependable procedure. The interrelationship between bronchospasm and allergy has aided in the determination of the etiology of asthma. This is rather disappointing when we consider the number of patients who give negative reactions to the numerous "skin tests." Many of them have obvious lesions in the upper respiratory tract and mouth and many surgical operations have been performed in the belief that the foci were the explanation of a reflex mechanism causing the asthma. At the Massachusetts General Hospital, F. M. Rackemann and H. G. Tobey (Arch Otolaryng 9:612 (June) 1928) undertook a study of the operative treatment with relation to foci of infection, and found it bears little relation to the outcome of the asthma. **Local treatment** of the nose and throat brought permanent relief from asthma in about 5 per cent of cases.

In treating asthmatics, Hurst (*loc. cit.*) considers the **removal of inciting factors** as leading to a diminution in the frequency of attacks, but we are unable to alter to any material extent the diathesis of disturbed chemistry of the body fluids. Many asthmatics have had remissions from 1 to 25 years, but the diathesis remains.

Therapeutically, a thorough and complete clinical study for hidden

foci of infection may be followed by **vaccine therapy**, but Willcox (*loc. cit.*) warns against the use of massive doses of bacterins, as the patient is already sensitive to the toxins of the bacteria harbored in his body.

Sir James Dundas-Grant (Practitioner 123:18 (July) 1929) believes the nasal factor in the treatment of asthma is frequently overlooked. He refers to the work of H. H. Dixon and Brodee and of S. W. Ranson (Trans Path Soc Lond 54:17) who have proven beyond question that stimulation of the mucous membrane of the nasal septum, especially in its upper and posterior part, can cause a loss of expansion of the lung which is attributed to a contraction of the bronchial muscle. Many intranasal lesions and conditions will influence and stimulate this sensitive area. Among others are edema of the turbinates, a deflected septum and mobile nasal polyp. Pronounced improvement has followed the **correction** of such nasal abnormalities. In many instances he has used an ointment containing anesthesin 20 grains (1.3 Gm), adrenalin solution 20 minims (1.25 cc), vaseline 2 drams (8 Gm) and liquid paraffin 2 drams (8 Gm), which has proven quite beneficial.

W. Storm Van Leeuwen (Practitioner 123:27 (July) 1929) states that 90 per cent of all asthmatics coming under treatment in Holland have as their causative factor an air-borne allergen. This he has proven by the symptomatic relief from **high altitudes** which are free from allergens and pollens, also from the use of **allergen-free chambers**, of which 80 per cent were benefited.

In spite of the varied and numer-

ous pharmaceutical aids in the treatment of the attacks, **adrenalin** (**epinephrin**) stands first and foremost on the list. Its action is believed to be upon the sympathetic system causing a rapid predominance of the dilatory effect of this system over the constricting effect of vagal stimulation during the attack. E. Schott (Deut med Wchnschr 54 963 (June 8) 1928) stresses the possibility of pituitary internal secretion deficiency in acute attacks and Weiss adds 0.04 c.c. **pituitary extract** to the 0.0008 c.c. **adrenalin**.

R. W. Lamson (J. Lab. and Clin. Med. 14 931 (July) 1929) reports the production of an *epinephrin habit* formation and shows that many patients persist in self-medication with the drug in spite of the fact that they profess to obtain no relief from its use. This, he believes, is the fault of the physician who begins treating the patient by the use of 0.6 to 0.75 c.c. (10 to 12 minims) or even 0.9 c.c. (15 minims) of **adrenalin** when probably 0.12 to 0.25 c.c. (2 to 4 minims) would suffice. He advises the substitution of some other drug for a period of time in an attempt to prevent the rapid increase in the dosage of the **adrenalin**.

Next in importance to **adrenalin** is **ephedrine**. It is a most important preparation because of its effectiveness by mouth. It also possesses more prolonged and sustained action in spite of the fact that its stimulation of the sympathetic system is slower. I. Pilot (M. Clin. North America 12 203 (July) 1928) reports many cases in which the immediate use of **ephedrine** per os has prevented the development of many severe attacks of asthma.

L. N. Gay and N. B. Herman (Bull. Johns Hopkins Hosp. 43 185 (Sept.) 1928) stress the value of **adrenalin** in a series of 100 cases and point out definitely that it is not to be completely replaced by its successor **ephedrine**. In their observations, the untoward effect of either drug warranted the use of the other and in many instances such a procedure was not only necessary but also successful.

As a last resort in many cases when the excessively large doses of **adrenalin** are of no avail and habit formation has occurred, it is frequently necessary to use **morphine sulphate** 0.016 Gm ( $\frac{1}{4}$  grain) frequently in conjunction with **atropine sulphate** 0.0004 Gm ( $\frac{1}{150}$  grain).

As stated previously, the treatment of asthma from the standpoint of *prevention* has such numerous methods and procedures that it is necessary to mention several which have proved efficacious in some cases.

Frequently the attention of students of this most elusive disease is turned toward the use of **vaccines**, both autogenous and stock. Wilmer (Delaware State M. J. 1 132 (Aug.) 1929) quotes J. Eiman (J. A. M. A. 89 953 (Sept. 17) 1927) as showing that in order to differentiate between allergic and toxic skin reactions with bacterial suspensions or toxins, one should always run controls on normal individuals. Wilmer describes the preparation of secretion filtrates, soluble toxins and bacterins. Secretion filtrates are prepared by collecting the secretion from the bronchi and sinuses under sterile conditions, diluted with sterile salt solution, shaken with beads, incubated for 24 hours at room temperature and passed

through a Berkefeld filter. The filtrates are placed in rubber capped bottles and tested for sterility.

Soluble toxins are prepared by placing a small amount of secretion in brain broth medium in tall tubes, incubated for 5 days and filtered through the Berkefeld filter. Before use, the filtrates are also tested for sterility. The bacterins are prepared in the usual manner according to standard methods.

Wilmer (*loc cit*) advises the initial dose be the amount of soluble toxin or secretion filtrate which does not give an area of hyperemia greater than 2 cm in diameter. The ideal method of administration is to give the soluble toxins and bacterins together every fourth day alternating with the secretion filtrates on the fourth day. Gradually increasing doses are given, care being taken to observe pronounced local or systemic reactions.

Comparing autogenous and stock vaccines, W C Voorsanger and F Firestone (California and West M 31 336 (Nov) 1929) studies 66 cases of bronchial asthma in which vaccines were used. Parallel results were obtained from those of stock and autogenous vaccines, so no specificity could be claimed. In a series of 346 cases studied by F M Rackemann and M A Scully (New England J Med 199 314 (Aug 16) 1928) gratifying results were obtained in 68 per cent of cases but autogenous vaccines showed no marked superiority over stock vaccines.

R Gobell (Zentralbl f Chir 55 2951 (Nov 24) 1928) attempted the cure of bronchial asthma by a **bilateral sympathectomy** in the neck, a finger's breadth above the clavicle. In the

majority of his cases, the desired effect was not obtained.

J Saidman (Arch méd-chir de l'app respir 3 480 (Dec) 1928) considers the use of **ultra-violet irradiation** as indicated when enlarged tracheo-bronchial lymphnodes or bronchitis are present. He believes the effect is produced by the action on the sympathetic nervous system, the liberation of certain substances of the skin which may act as protein therapeutic agents and a direct action on the bronchial foci.

The use of **allergen-free chambers** has been reported in about 400 cases by O König (Med Welt 2 682 (May 5) 1928). An allergic diathesis was found in 82 per cent of cases and inoculations gave 65 per cent positive reactions of those treated, 95 per cent were positive in those with allergic diathesis. He also states most all cases of asthma with positive skin reactions will be made free from attacks or greatly improved by the allergen-free chamber but only 15 to 25 per cent of cases with negative skin reactions will be benefited.

**CARDIAC ASTHMA** — McCrae (Endocrine Survey 6 67 (Feb) 1929) criticises the use of the term "cardiac asthma" as being misleading. Such a term leads frequently to the incorrect treatment of such a case with adrenalin.

**ETIOLOGY** — F Brunn (Zentralbl f inn Med 49 873 and 890 (Sept 15) 1928) believes the cause of cardiac asthma is the stream of fluid which passes from the tissues into the blood stream and must pass through the pulmonary capillaries. For this reason he believes the use of **pituitary extract** is valuable in retaining the fluid in the tissues.

**DIAGNOSIS**—R. S. Palmer and P. D. White (J A M A. 90 2060 (June 23) 1928) give as a reliable differential diagnosis between cardiac and bronchial asthma, the use of morphine sulphate which is almost a specific in cardiac asthma. If no relief is obtained, it is almost certain the case is allergic asthma. The reverse applies for the use of adrenalin and seldom are the 2 conditions associated.

**ASTIGMATISM.—DIAGNOSIS.**—“*Velonoskiascopy*,” the name given a new test for astigmatism devised by Trantas, means “viewing the needle shadow.” Trantas, who is himself astigmatic, discovered that when he held a thin linear object before his uncorrected eye and looked at a chalk line on a blackboard, the object seemed to throw a shadow on the chalk line. L. W. Morsman (Am J Ophth (supp) 3 33 (Nov) 1928) gives the following rules for Trantas’ technic:

1 Refract the patient as in the regular procedure.

2 Test the eye separately as in refraction.

3 Place the trial cross in the refraction frame (never a stationary frame such as the phoropter) with the arms of the cross in the principal meridians found during retinoscopy and other procedures.

4 Explain to the patient just what he is to look for and how to find it. As we are accustomed to focus vertical lines, tell the patient to find the vertical interval first and then, by moving the head slightly up and down, bring both into view.

5 Now add cylinders until the intervals are equal. The best technic

consists in adding a minus cylinder with its axis on the broadest interval.

6 When the astigmatism is corrected, gradually reduce the amount of fogging sphere until the intervals due to diffusion circles disappear, and note if they remain equal to the last. The cylinder now in the frame represents the patient’s astigmatism with its axis.

7 Lastly, remember that this is a subjective test and its value depends upon the patient.

Errors may frequently be corrected by this procedure to 0.12 diopter. In the cases of less intelligent patients the test is doubtful and often worthless. In certain cases in which the findings of retinoscopy are doubtful but vision is normal it may prove to be the best method of finding the astigmatic error.

[It is usually a good plan to have more than 1 method of making a diagnosis but this new method of studying astigmatism will not supplant retinoscopy, as it is purely a subjective test and is not applicable to the study of children’s eyes.—Ed.]

**ATELECTASIS.—ETIOLOGY**—Although there is a pronounced relation between medical and post-operative pneumonia, bronchitis, atelectasis, pulmonary abscess and gangrene, P. N. Coryllos (J A M A 93 98 (July 13) 1928) believes there is only one cause for atelectasis and that is bronchial obstruction which must be complete. Many other factors such as posture, cough, narcotics, post-operative pain, etc., influence it, but they are not the real cause. In practically every upper respiratory tract a Group IV pneumococcus is present which will produce atelectasis,

bronchitis, pneumonia, lung suppuration or gangrene, depending on the virulence of the organism and the resistance of the patient H K Mohler (Am J M Sc 177 507 (Apr) 1929) corroborates this opinion by the observation that the removal of the mucus plugging a bronchus results in immediate relief from the obstruction and the lung promptly expands with air

R P Ball (Arch Surg 17 82 (July) 1928) reports a necropsy on a case of atelectasis in which he believes the causative factor was a mechanical obstruction of the foramen of Winslow causing a fixation of the diaphragm E G Stoloff reports a case (Am J Dis Child 35 239 (Feb) 1928) in which he believes a lymphadenopathy caused the obstruction of the bronchus

**SYMPTOMS**—The onset is sudden with dyspnea and cyanosis Respiratory rate is increased to 40 or 50 per minute The temperature is elevated to 100 to 104° F (37.8 to 40° C) Leukocytosis to 20,000 has been reported Cough is first unproductive, later productive and may be blood tinged The patient looks ill but does not exhibit the toxicity of pneumonia

**PHYSICAL SIGNS**—The right lung is involved 3 times as frequently as the left Diminished respiratory movement and retraction of the intercostal spaces is present on the affected side The note over the collapsed lung is dull The area of vacant thoracic cavity is tympanitic or hyperresonant to percussion Breath sounds are diminished and there is an upward displacement of the heart, mediastinum and diaphragm to the affected side

**DIAGNOSIS.**—This depends on the physical findings particularly the

displacement of the heart, mediastinum and diaphragm, confirmed by the roentgenogram

**PROGNOSIS.**—This is good as the majority of cases recover within 1 to 4 weeks, unless complicated by some other factor which may cause a fatal outcome

**TREATMENT.**—Y Henderson (J A M A 93 96 (July 13) 1929) believes the one important *prophylactic* measure in pulmonary congestion and stasis, particularly in *carbon-monoxide poisoning*, is the use of *carbon dioxide* to stimulate the respiratory center

Although it is unwise to subject a patient to ether anesthesia, bronchoscopic removal of the obstruction is of paramount importance **Postural changes** to promote pulmonary drainage are beneficial Supportive, eliminative and symptomatic measures are also in order

**AVERTIN.**—Avertin, tribromethyl alcohol, was introduced in 1926 and is now being rather widely used, especially in Germany, in the induction of anesthesia J Blomfield and F E Shipway (Lancet 1 546 (Mar 16) 1929) state that it is given in a 3 per cent solution by rectum The dose is from 0.09 to 0.15 Gm (1½ to 2¼ grains) per kilogram (2½ pounds) body weight It produces unconsciousness quickly and quietly It has no untoward effects on the respiration or circulation There is a slight fall in blood-pressure, usually about 10 mm Hg Analgesia and amnesia persist for about 3 hours after the operation Age is no contraindication to its use It should not be used in chronic pulmonary disease, acute or chronic nephritis, heart disease without cardiac reserve, ulcerative lesions of the colon, increased intracranial pressure, and brain tumors It is indicated particularly in patients who dread a general anesthetic, for persons with **exophthalmic goiter** and those in whom the psychic aspect of the matter is of importance

It is also of value in the treatment of tetanus.

### AVIATION MEDICINE.—

F Ceres, Commander, Medical Corps, U S N. (U. S Nav M Bull 26 271 (Apr) 1928) states that aviation, now in a pioneer stage, embraces the finding and eliminating of casualty producing factors among fliers To him a few of the conditions and difficulties experienced by fliers are briefly (a) Staleness of fliers (neuro-circulatory asthenia, physiological fatigue, effort syndrome, soldier's heart, irritable heart), (b) aviation sickness (air sickness, air nausea, balloon sickness), (c) altitude sickness (mountain sickness)

The duty of the flight surgeon includes not only the selection of the mentally and physically qualified, but also the maintenance of the flier in the proper physical condition In the selection of medical officers for aviation duty, the selection of men who will win the confidence and admiration of the fliers is paramount

David Ranken (Lancet 2 1263 (Dec 17) 1921) studied in great detail the vestibular mechanism, the importance of free nasal air-entry and mouth-breathing, the auditory acuity, the effect of a deviated septum and enlarged or unhealthy tonsils and adenoids Relating the ability of many fliers in the English service during the World War, Ranken believes although their efficiency was proven over and over again, it was in spite of their defects and he believes their standards of excellence would have even been higher had they conformed more to the normal

In reference to a lowering of the standards by which applicants for the flying service are chosen for another

war, in an event that the demand far exceeds the supply, the author believes that aside from those men who required nasal surgery, the debatable cases would be men with chronic suppurative otitis media, with or without hearing defects, who were in all other respects perfectly healthy.

**AVITAMINOSIS.**—It appears, from the work of H M. Evans of California (Bull Soc scient d'hyg. aliment 16 382, 1928) and his associates, as if *sterility* may in many cases be favored by vitamin deficiency Certainly he has demonstrated that in rodents there is a vitamin essential for reproduction and this has been confirmed by Barnett Sure (J Biol. Chem 76:673 (Mar 28) 1928) This dietary ingredient is found in lettuce When it is withheld, sterility results even though the other usual vitamins are present in the diet in adequate quantity for maintenance, growth, and health Cowgill, Stucky, and Rose (Arch Path 7 197 (Feb) 1929) working at New Haven, observed that when dogs were fed for long periods on a diet adequate in every respect save in vitamin B, certain symmetrical skin lesions appeared which were dissipated on administration of the deficient vitamin The partial anorexia was simultaneously corrected In this connection it should be noted that McCarrison reports the frequent occurrence of pathological changes in the intestine and stomach of animals subsisting on deficient diet On the other hand, it was found in a study of the digestive functions of animals fed diets deficient in vitamins that the differences from normal were apparently too

small to be significant. Nevertheless, it has been found that decrease in vitamin B intake, as yeast, decreases utilization of food and detoxifying power of the body for sodium benzoate. In the U. S. Public Health Report, Number 44, Goldberger reports that the antipellagra vitamin is found in Alaska salmon even in the preserved state. He concludes from this that salmon may be used instead of meat in areas of *pellagra* endemicity when meat is not easily procurable. The facts give evidence that the correlation between black-tongue in dogs and pellagra in man is well taken. A relation of the anti-rachitic vitamin to parathyroid function has recently been suggested.

Amelioration or prevention of *parathyroid tetany* in dogs by cod-liver oil is reported. Other work done on young dogs reared on artificial diets with a Ca/P ratio of 1/18 to 1/64 without vitamin D showed that such animals failed to respond by marked increase in serum calcium when injected with a potent parathyroid extract. No clinical symptoms of overdosage were obtained. The lack of response was independent of the presence of active rickets or other bone disease. Other dogs on like dietary régime gave abnormally large serum calcium increases with parathyroid extract when cod-liver oil or viosterol was administered. Rapidly fatal symptoms of overdosage followed. This occurred even when the

animal showed active clinical rickets. Like results were had with alkali ( $\text{NaHCO}_3$ ). The authors point out the clinical significance of this and caution against the dangers of overdosage with high vitamin diets and parathyroid extract concurrently. Avitaminosis in rats apparently retards learning ability as shown by maze experiments.

In pigeons, the virulence of anthrax bacilli is increased when passed through birds suffering from beriberi. Vitamin B deficiency further seems to be accompanied by an increase in the lactic acid of the blood with concomitant decrease in pH. The weight, iodine content, and iodine percentage of the thyroid gland became larger also. In the field of malignancy it has been noted that the complete deprivation of all vitamins retarded but did not inhibit growth of transplantable tumors in mice. Vitamin B stimulates tumor growth more than does A. When B is adequate it can stimulate tumor growth even when A is absent. Evidently B is necessary for tumor growth. Tumor mice fed a diet low in carbohydrates and deficient in vitamin B live longer than controls. Growth is not accelerated by a protein rich diet under these circumstances. Of particular significance in treatment of avitaminosis is the evidence tending to show that overdosage, especially with activated ergosterol, may well be harmful.

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## B

**BACKACHE.**—There have been no real new contributions to this subject in the recent literature. J. T. O'Ferrall (J. A. M. A. 91: 532 (Aug

25) 1928) stresses the rôle of the soft parts after injuries (so much stress is placed upon bone injury or bone malformation in the Courts at the



present time, that soft structure injury is frequently lost to sight—Ed ) and believes that entirely too much importance is placed upon bone pathology. Some of the anatomy and physiology is given in support of his contention. He advises fixation of the spine on the pelvis by suitable apparatus until the patient is symptom-free.

M. B. Wesson (California and West Med 27 346 (Sept) 1927) calls attention to the rôle of seminal vesiculitis in the production of backache. He recognizes this by tenderness of the affected parts, with no local tenderness or loss of function in the painful part of the back.

L. R. Boies (Minnesota Med 11 576 (Sept) 1928) lays stress on the prostate in the production of backache and as a factor in the prolongation of the disability after injury.

The report of the Committee of the Clinical Orthopedic Society is given by R. W. Billington, T. A. Willis and A. O'Reilly (J. Bone and Joint Surg 10 290 (Apr) 1928). The varying opinions as to the causes of backache are interesting and the results of this inquiry so instructive and so illuminating on many points that the tables are appended in their entirety.

Question 1 In your opinion, what are the causes of back pain?

TABLE I—CAUSES OF BACK PAIN

Condition	Surgeons giving	Condition	Surgeons giving
Arthritis	58	Spondylolisthesis	7
Strain	51	Underdevelopment	7
Posture	50	Abdominal conditions	7
Congenital anomalies	43	Flat foot	5
Trauma	40	Fracture	3
Infection	28	Exposure	2
Pelvic conditions	28	Constipation spasmodicity	2
Fibrositis	12	Automobile driving	1
Varied conditions	10	Luxations	1
Genito-urinary conditions	9		

Question 2 Which of these causes are the most common?

TABLE II—MOST COMMON CAUSES OF BACK PAIN.

Condition	Surgeons giving	Condition	Surgeons giving
Arthritis	30	Sacro-iliac conditions	9
Posture	18	Congenital anomalies	4
Trauma	17	Pelvic conditions	3
Strain	15	Flat-foot	1
Focal infection	10		
Fibrositis	4		

Question 3 Do abnormalities of the lumbosacral region play an important part?

TABLE III—PART PLAYED BY LUMBOSACRAL ABNORMALITIES

Reply	Surgeons giving
Play an important part	28
Do not play a part	18
Are a factor	25
Have slight influence	8

Question 4 What is your opinion on sacro-iliac dislocations? Sprain?

TABLE IV—OCCURRENCE OF SACRO-ILIAC DISLOCATIONS

Reply	Surgeons giving
Seen after severe trauma	17
Never seen	3
Rare	20
No (statement without explanation)	2

TABLE V—OCCURRENCE OF SACRO-ILIAC SPRAIN

Reply	Surgeons giving
Common	39
Moderately common	9
Rare	21
Does not occur	4
Yes (statement without explanation)	2
Undecided as to occurrence	1

**BACTEREMIA.**—Bacteremia probably occurs more frequently than is generally supposed. But it must be urged that the mere presence of bacteria in the blood does not mean a real sepsis. The defenses of the body see to this. Numerous physicians have asked how often bacteria are present in the blood of normal individuals and under what circumstances. It is now fairly well established that *colon bacilli*, for instance, can penetrate an intact bowel wall and thus get to the liver via the portal vein, to be destroyed in this organ. It is readily understandable that such a "subinfection" may be of serious consequences at times.

That bacteria can pass the placenta

at times also seems certain from various reports J D Soifer (Am J Obst and Gyn 16 889 (Dec) 1928) now reports a *Bacillus pyocyaneus* infection of this origin During and shortly after labor, provided only that the blood be examined at the right time, it is possible to demonstrate organisms in the blood in many cases, in which no fever occurs Thus, E Kulka (Zentralbl f Gynak 53 202 (Jan 26) 1929) found 7 positives in cultures of 40 patients In 5 of these positive cases, there was no fever at any time The organisms were *B coli* and *Staph albus*

In postoperative urological cases, W W Scott (J Uiol 21 527 (May) 1929) found bacteremias in 62 per cent of cases, the portal of entry being probably the urethra in most of them Death resulted from sepsis in 18 per cent of the positive cases He stresses prevention and the elimination of the primary focus of infection

The study of anaerobes in various suppurative and gangrenous conditions, such as acute appendicitis, has demonstrated their presence as quite active invaders L Boez, A Kehlstadt and J Schreiber (Ann de med 23 340 (Apr) 1928) report 7 cases of *B ramosus* bacteremia, but state that apparently the prognosis is governed rather by the initial infectious focus and its metastases than the presence of these organisms in the blood

As a rarity, R A Kilduffe and S L Salasin (Med J and Record 130 567 (Nov 20) 1929) report a fatal bacteremia due to *Escherichia pseudo-dysenteriae* Kruse

Many questions regarding *tubercle bacillus* bacteremia are asked such as its frequency, its gravity, etc. Whether or not the production of an

artificial pneumothorax favors the entrance of organisms into the blood has been studied by J E Wolf (Schweiz med Wchnschr 59 742 (July 20) 1929) He found that if tubercle bacillus bacteremia occurs at all, it is sporadic and of only short duration The production of an artificial pneumothorax may directly open some vessels and favor entrance, but actual invasion seems rare The increase in tuberculous antibodies for a day or 2 after pneumothorax has been made is more likely a response to toxins than bacteria

**BACTERIOPHAGIA**—Bacteriophagia was first given widespread attention by the work of d'Herelle, and its application in therapy has in recent years been given further test It has been rather slow to gain acceptance as a possible agent in the warfare against infection A bacteriologist has recently remarked that a substance capable, even in extremely small quantities, of killing and dissolving the bacteria with which it comes in contact, and which at the same time is harmless to animal tissue, should have an immediate application to sterilization of body cavities in which bacteria are present The bacteriophage, however, shows marked specificity, and so enhances the necessity of the use of selected products of high virulence for attacking the organism to be destroyed Perhaps it will help to explain the unfavorable reports that have been published N W Larkum (Am J Pub Health 19 31 (Jan) 1929) reminds us that the bacteriophage filtrates are not only lytic for certain micro-organisms, but also may act as an antiviral Larkum insists that a bacteriophage must have certain characteristics These are freedom from reactions, a factor of inestimable value when it is considered that one of the chief objections to inoculation is the discomfort, amounting to disability in some cases, the ease and cheapness of production, the variety of antigens which may be included, and the availability of the prophylactic agent as a therapeutic agent in case of epidemics

**THERAPEUTICS.**—In a study of 150 clinical cases, T B Rice (J Indiana M A 21 509 (Dec) 1928) reports the results of the use of bacteriophage filtrates. Among the conditions represented were **carbuncles** and **boils**, all of which showed definite improvement after the first application. Early boils regressed, later ones became liquid and discharged the core. The bacteriophage was applied locally or was injected into the tissues around the boil. In cases of **staphylococcus cellulitis**, the pain ceased promptly and marked improvement was noted in 24 hours. In cases of **osteomyelitis** the results differed. If necrotic bone was present, its removal was necessary before the treatment caused much benefit. **Bed sores** were treated with success. The bacteriophage has no effect on the body cells. In cases of **leg ulcers**, the treatment caused prompt cessation of foul drainage and the appearance of healthy granulations. **Suppurating wounds** also responded very favorably. In fact, the more pus there was in the wounds, the better the results. Cases of **acne vulgaris** have been treated sometimes with success and sometimes with failure. The bacteriophage is effective in all **staphylococcus lesions** if there is no bone involvement and the blood stream is not invaded. The stock preparation seems just as effective as the bacteriophage prepared against an autogenous culture.

F M Burnet (Med J Australia 1 406 (Mar 30) 1929) reviews briefly the development of our knowledge of the bacteriophage. The evidence so far shows that in the diseases which are largely septicemic, the bacteriophage plays little part, and can be of therapeutic use only indirectly, but that in infections, particularly those limited to the contents and lining of the alimentary canal, such as **bacillary dysentery** and **cholera**, a bacteriophage active against the pathogen usually develops and may be a factor in determining recovery. In the latter group the administration of active bacteriophage by mouth is a rational therapeutic procedure.

**BANANA FEEDING.**—About 12 or 13 years ago, bananas were first advocated as a food for infants and since that time their popularity

has increased. They are known to contain vitamins A, B, and C. U Gruninger (Arch f Kinderh 84: 284 (July 20) 1928) found that if bananas were added to a rickets-producing diet, experimental animals, although they developed rickets, did not have a severe form of it. From this he concluded that a small amount of vitamin D was also present in bananas. Gruninger corroborated the work of previous investigators that this fruit prevented scurvy and therefore must contain amounts of vitamin C.

In addition to their vitamin content, bananas contain a very high percentage of easily digested carbohydrate, but very little fat or protein. For this reason they have been employed in **celiac disease** and in **nephritis**. Recent investigators have studied their value as a food for normal and for undernourished infants. Shriver and Ross (Canad M A J 20 162 (Feb) 1929) substituted banana pulp in equivalent caloric amounts for cereal and potato in the diets of children and to replace cereal and sugar in the **feeding of infants**. There was no change in the character of the stools of patients on this diet and resistance to infection was good.

Brown and Courtney (Canad M A J 21 37 (July) 1929) added 3 to 6 bananas a day to the diets of children aged over 5 years, and studied the retention of fat, nitrogen, chloride, calcium, magnesium and phosphorus as compared with a control group of children who receive their regular diets without bananas. There were no significant differences except a slightly decreased nitrogen retention in the children of the first

group The bananas were well tolerated, did not cause diarrhea and the stools showed no gross evidence of undigested material

McNamara (Amer J Pub Health 19 605 (June) 1929) advocated the use of banana pulp and milk as a supplementary lunch for **undernourished children**.

The method of giving bananas has been discussed by Von Meysenburg (Arch Pediat 45 509 (Sept) 1928) One should select only bananas which are ripe, showing a few black spots on an entirely yellow skin and a pulp that is not brown or too soft The pulp should be passed through a fine wire sieve and then added to the diets of infants 4 or 5 months old in teaspoonful quantities, increasing a teaspoonful each week until the child is receiving 6 to 8 teaspoonfuls a day The author has employed this diet in 140 infants including 1 with **scurvy**, 1 with **celiac disease** and 3 with **hemorrhagic nephritis** Only 1 case developed diarrhea The banana probably effected a cure in the infant suffering from **scurvy** and was well tolerated by the other patients

**BANTI'S DISEASE.**—The nomenclature remains quite confusing It seems likely that new knowledge in the future will finally bring about a division of conditions of splenomegaly and anemia into a number of well defined groups As Howard puts it, the knowledge of this disease is definite without being complete enough A mistaken idea seems to be current that the *diagnosis* of Banti's disease cannot be made until late in the course, until there is the splenomegaly and anemia and the cirrhosis of the liver, the ascites, the

hemorrhages, etc, also This is unfortunate if it is so, for treatment (**splenectomy**) is successful in inverse ratio to the length of time the disease is existent But it is not true, for Banti himself and later Osler and many others described this disease very clearly from beginning to terminal stages The diagnosis therefore can be made early Since the *treatment* of choice is **splenectomy**, it is necessary to exercise judgment in cases of splenomegaly when this should be done J B Deaver and S P Reimann (Ann Surg 88 355 (Sept) 1928), adopt the broad division of primary and secondary splenomegalies and state that some cures by splenectomy can be effected in the primary varieties and even if the patient is not cured, relief and prolongation of useful life are common But secondary splenomegalies are never relieved by splenectomy except when the size of the spleen is a menace By secondary splenomegalies are, of course, meant those due to the leukemias, malarias, cirrhosis of the liver, etc When, therefore, a thorough search reveals no cause for the enlargement of the spleen and the anemia, splenectomy must be considered

J C Davies (Lancet 2 498 (Sept 8) 1928) considers the relationships between Banti's disease and portal and splenic vein thrombosis He reports 2 carefully considered cases and concludes they are, in truth, primary splenomegalic anemia and not thrombotic splenomegaly Warthin's challenge seems to be met There do occur such cases without thrombosis

Naturally, the thrombosis of portal and splenic veins in certain cases focuses attention on the blood plate-

lets among other things. The tendency to hemorrhages from the gastro-intestinal tract is another fact of platelet interest. W. H. Evans (Lancet, 1 277 (Feb 9) 1929) concludes hemorrhages may be due to 2 factors, (1) mechanical, related to the splenic and portal thrombophlebitis and (2) deficiency of platelets. He further points out the risk of post-operative thrombosis in cases with high platelet counts. On the other hand there is risk of bleeding in cases with thrombocytopenia.

E. Greppi points out again that Banti's disease is characterized by normal resistance of the blood cells. In primary hemolytic icterus (almost always hereditary or familial) there are signs of constitutional anomalies in the red blood cells such as diminished resistance to hypotonic salt solution, microcytosis, etc. (Riforma med 27 1, 1928).

**BARBITAL.—DEFINITION AND SYNONYMS**—The joint chemical experimental and clinical studies of E. Fisher and J. von Mering (Ther d Gegenw 5 97, 1903) established in 1903 show that while barbituric acid, a derivation of urea and malonic acid, is physiologically relatively inactive, the substance obtained by replacement of the 2 hydrogen atoms by ethyl radicals is a powerful hypnotic in animals and man. This diethylbarbituric acid, commercially called veronal, or barbital, is a more efficient analgesic and hypnotic than chloral, paraldehyde and some other hypnotics. A large number of barbituric acid derivatives have been prepared. The following are the most widely used: Diethyl barbituric acid (*veronal* or *barbital*), sodium salt of veronal (sodium veronal or *medinal*), iso-amyl-ethyl barbituric acid (*amytal*), iso-allyl-propyl barbituric acid (*allonal*), calcium-ethyl-iso-propyl barbituric acid (*ipral*), n-butyl-ethyl-barbituric acid (*neonal*), cyclohexenyl-ethyl barbituric acid (*phanodorn*), phenyl-ethyl barbi-

turic acid (*luminal*) and its sodium salt, *sodium luminal*. All these names are synonyms for substances which are closely related chemically in their pharmacologic and therapeutic action.

**PHYSIOLOGICAL ACTION**—Studies by S. Weiss (Am J M Sc. 178: 390 (Sept) 1929) show that the intravenous administration of the barbituric acid derivatives has a distinct therapeutic value, but he warns against its indiscriminate use. He discounts the pharmacological effects and toxicity in animals and men, together with their therapeutic uses in the latter, with especial reference to sodium luminal. He contends that humans are more susceptible to these drugs than animals, and that in man a relatively smaller percentage of the fatal dose produces analgesia and narcosis.

Marked individual variations exist in the response of patients to identical doses, and the state of the central nervous system is one of the important factors determining these variations. Sensory and motor excitement act antagonistically, while depression acts synergistically with the barbituric acid derivatives. The mechanism of the action of these derivatives is different from that of ether, chloroform and nitrous oxide. The hypnotics of this series have a marked inhibitory influence on certain medullary and mid-brain centers.

**THERAPEUTICS**—Weiss (*ibid*) injected sodium luminal intravenously in doses of 0.4 to 1.2 Gm (6 to 19 grains) at a rate of 50 mgm ( $\frac{3}{4}$  grain) per minute in a 10 per cent solution. This stops convulsions, produces muscular relaxation, and induces sleep with considerable regularity. The narcosis may be superficial, and the analgesia only partial. In certain cases with severe status epilepticus, eclampsia, grave toxic reactions from local anesthetics, convulsions due to cerebral hemorrhage or tetanus, the intravenous injection of *sodium luminal* is of distinct value. The dose should be determined by the individual behavior of the subject during the slow intravenous administration of the hypnotic. It should be remembered that a hypnotic dose of any barbituric acid derivative entails danger for the patient because it depresses certain vital centers, especially in susceptible individuals.

**BARIUM CHLORIDE.**—Barium chloride has come to be used fairly extensively to increase the idioventricular rhythm in A-V heart block. By restoring this rhythm, syncopal and convulsive seizures have been prevented. T. M. McMillan and C. C. Wolferth (J. Lab. Clin. Med. 14: 839 (June) 1929) reported a case of complete atrioventricular heart block in which in 1 instance barium chloride, in doses of 20 mg ( $\frac{1}{2}$  grain) 4 times a day for 4 days, failed to increase the effective ventricular rate. A marked extra-systolic disturbance, with frequent short runs of rapid ventricular tachycardia, was produced. They regard this as being an untoward result and as potentially serious.

**BASAL METABOLISM.**—The determination of basal metabolism continues to occupy an important position in differential diagnosis. Benedict suggests that the basal metabolism of any individual may be indicative of the general level of vital activity for that individual. It may indicate the relative physical fitness of an individual at any given time. With low metabolism, apparently, there is a lowering of the physical fitness or physical reserve of the individual compared with the vitality associated with an increase in metabolic rate in the same person. It has not yet been established that there is a difference between the basal metabolic rate of different races. While these larger considerations of the metabolic rate remain as yet unsettled, physicians and surgeons are finding the basal metabolic rate of real merit in the study of many of the perplexing conditions seen clinically. Fallacious readings are infrequently obtained, due to the following discrepancies in technic: First and foremost, improper training of the technician, (2) over-apprehension on the part of the patient, (3) improper instructions to the patient, (4) an unreliable apparatus, (5) insufficient checkup, (6) improper preparation of the patient, *i.e.*, having the individual appear at the laboratory with a full meal, etc.

At the present time, several manufacturers have placed apparatus on the market for the determination of basal metabolism which are sufficiently accurate, in the hands of carefully trained operators, to be of

value in differential diagnosis and equally simple to manipulate.

**IN DIFFERENTIAL DIAGNOSIS.**—In the differentiation of such conditions as *cardiovascular neurosis*, *neurasthenia* with *goiter* from true *exophthalmic goiter*, F. Peiser (Arch. f. Verdauungskr. 42: 542 (Apr.) 1928) found that the basal metabolic rate was of value in making the diagnosis. In the former condition the rate was normal or below normal, whereas in 2 cases of *hyperthyroidism* the rate was invariably increased. T. Funding (Ugeskr. f. læger 91: 1013 (Nov. 14) 1929) finds that the basal metabolic rate may be accepted as indicative of the degree of the pathological change present and, to a certain extent, of the effect of treatment. This writer believes that in certain cases of *obesity*, significant changes in the rate occur, and further, that the basal metabolism may prove of value in any or all of the various endocrine disorders. R. Vaccarezza, L. L. Silva, J. Alurralde and C. Grist (Prensa med. argent. 15: 1350 (Apr. 10) 1929) investigated the statement that the basal metabolic rate was decreased by acidosis and increased by alkalosis. Of 100 cases in which the hydrogen ion concentration of the blood was normal in 52, acid in 20, and alkaline in 28, the basal metabolic rate was normal in 40 cases, increased in 45, and decreased in 15.

The determination of the basal metabolism is considered an important diagnostic procedure in the study of emotional states. Thus, G. W. Henry (J. Nerv. and Ment. Dis. 70: 598 (Dec.) 1929) found a definite relationship between the basal metabolism and the emotional states of patients, regardless of the personality disorder. He points out that overactive, elated and overtalkative states are accompanied by an increase of the basal metabolism, while underactive, undertalkative and depressed states are accompanied by a diminution in the basal metabolic rate. Hence, an agitated patient usually exhibits an increase in the basal metabolism, but this may be counteracted by the intense depression present. Apathetic conditions may show a decrease in the basal metabolism. Henry makes an important suggestion, namely, that some of the so-called normal variations found clinically in the metabolic rate of

the same individual may be due to different emotional states presented by the same patient. He again calls attention to the fact, well known but often overlooked, that the rate may be influenced to a pathological degree with no other factor present than a very strong emotional state. Therefore, in the final interpretation of the basal metabolic rate in any given patient, regardless of the illness, the prevailing emotional state of the patient tested must be considered.

In studying the basal metabolism of patients with *heart disease*, O. Jervell (Norsk mag f laegevidensk 90 1269 (Dec) 1929) reviewed the findings of his studies in 45 patients. In 14 of these, the basal metabolic rate was somewhat below normal, while in 22 cases it was raised 10 per cent or more, in 17 cases, 15 per cent or more, and in 4 cases there was an increase of over 50 per cent. Four of 16 cases of mitral disease, and 4 of 6 cases of aortic disease revealed an increase in the basal metabolic rate. In 12 patients with high blood-pressure an increase in the rate was shown to an unusually high degree, even with compensation present. No parallelism was noted between a rise of blood-pressure and the metabolic rate. High blood-pressure cases, however, were more frequently accompanied by high readings of the basal metabolism than with those patients with a normal or slightly increased blood pressure. A normal basal metabolism was found in 5 cases of cardiac neurosis.

An increase of the metabolic rate in patients with cardiac disease is of real diagnostic value when a concomitant thyroid condition may be present. In these cases, it may be accepted that increase may sometimes be due to cardiac insufficiency or hypertension, and not alone to thyroid intoxication. The increase in the oxygen consumption may occur from a defective resynthesis of the lactic acid into glycose as Eppinger has shown.

V. Cordier (J de méd de Lyon 10 151 (Mar 5) 1929) believes that in the early stages of *pulmonary tuberculosis*, the increase in the basal metabolic rate is in direct proportion to the gravity of the prognosis for the development of the pulmonary lesion during the exacerbation of the disease. He feels, however, that in the

advanced stages—he bases his conclusions on a thorough study of 200 cases—the basal metabolism is variable and unstable and, therefore, of no especial diagnostic value, since so many extraneous factors, such as digestive, hepatic, nutritional and cerebral disturbances, influence the rate by modifying endocrine activities. In support of the previous statement, he found in 43 cases of incipient pulmonary tuberculosis with a slightly increased or lowered basal metabolic rate, benign exacerbation in 67 per cent of cases, whereas in 37 cases which showed a considerable increase of the basal metabolic rate, the exacerbation of the pulmonary symptoms proved serious or fatal in 75 per cent.

Studying 42 patients with *asthma* in whom the origin of the disease was suspected of being endocrine, Cordier (*ibid*) found 3 individuals with hypothyroidism, 18 with hyperthyroidism, and 21 with dysthyroidism, with the stages of hyper- and hypothyroidism alternating irregularly in the last designated group. From these observations he concludes that the basal metabolic rate in asthma appears of value from the standpoint of treatment. In a careful study of patients with *nephrosis*, R. Platt (Quart J Med 23 129 (Oct) 1929) points out that profound metabolic disturbances occur, that the rate may fall to as low as minus 30. With this condition there is a remarkable tolerance for thyroxin, much more so than occurs in myxedema. Platt points out that this is not due to abnormal thyroxin excretion.

In the study of 30 cases of *lymphoblastoma*, C. I. Krantz (Am J M Sc 176 577 (Oct) 1928) found the basal metabolic rate was elevated as a rule, not alone in chronic lymphatic leukemia but as well in other kinds of lymphoblastoma, especially when the disease has become widespread. X-ray therapy causes a fall in the basal metabolic rate proportional to the diminution of untoward manifestations of the tumor itself. In this manner, the basal metabolic rate is useful in the determination of therapy and prognosis.

B. Sparacia (Gior ital di dermat e sifil (June) 1928) considers that basal metabolic determinations should be made on all cases of *cutaneous disease* and that every dermatologist should acquaint himself with the

interpretation of the findings. He draws attention to the fact, that in a study of 31 cases of *alopecia areata*, 10 showed an increase in metabolic rate, while in 9 it was decreased. Similar variations from the normal were noted in patients showing *pigmentation*, *scleroderma* and *eczema*.

### BEHAVIOR PROBLEMS OF CHILDREN.—THE PROBLEM CHILD—V

C. Branham (Psychiatric Quart 3 569 (Oct) 1929) has analyzed the results of a study of 1671 problem children in New York State. He found that the group showed a tendency toward the prolongation of the infantile period—unusual prolongation of the nursing period, frequency of enuresis and thumb-sucking. Another notable feature was the prevalence of emotional instability during infancy. This is attributable in part to the marked neurotic tendencies throughout the group and to incidental maladjustments—digestive disturbances, uncleanly conditions, and poor maternal care—during the infantile period. Physical and intellectual development was retarded as compared with average children in the community and the incidence of physical stigmata and the tendency to contract disease was about normal. [With this statement the majority of authorities are not in agreement. Problem behavior is found at least as frequently among the intellectually and physically average group and is the result of emotional difficulties rather than physical or intellectual ones.—Ed.]

P. L. Schroeder (J A M A 92 10 (Jan 12) 1929) calls attention to the fact that difficult labor and the resulting birth trauma may be another factor in the production of later difficulties, but that the cause of the

behavior is the mental retardation resulting from the brain injury.

Mary Chadwick (Internat Congr Ment Hyg, May, 1930) calls attention to the fact that recent therapeutic measures have centered their attention on ways and means of bettering the condition of the neurotic child by remedying conscious difficulties and improving harmful environments, and wonders whether the root causes of the abnormalities which give rise to the symptomatic behavior have not been neglected, and whether the child as a sick child has not fallen out of the picture. There has been little attempt to understand that the symptoms were the results of conflict between the infantile impulses, the ego, and the environment because of the action of repression. Assuming that the chief characteristic of neurosis is conflict, she postulates 4 main groups of conflicts.

1 *Infantile impulses*—love, including self love, hate, sadism, exhibitionism and curiosity—seeking gratification in conflict with repressions. The early emotional outbreak (the larval form of hysteria) is the infant's struggle to obtain its wish and oppose the deprivations demanded by training, the symptoms providing the channel for gratification.

2 *The child in conflict with infantile impulses*—conversion hysteria, anxiety hysteria and obsessional neuroses. In the first, a physical symptom takes the place of the emotional outburst and at the same time may act as an inhibition of forbidden function, a form of self-punishment or a demonstration against the actions of someone else. In the second, the fear is a means of obtaining the desired gratification or a defense against the



breaking through of infantile impulses In the third, the teaching of the parents aids the work of repression and the child tries to adjust itself to social demands, often to its own detriment. The most typical character of the last group is the feeling of "mustness"

3. *The child's ego in alliance with infantile impulses in open conflict with parents, society and environment*—the typical delinquent or criminal child

4. *The child in conflict with reality*—the child seeks to withdraw from the responsibilities of life by remaining in the infantile stage—one type of neurasthenic child (born tired) and the early psychotic child

Treatment must lie in a thorough investigation of the direction of the conflict and its causes, not only with those that are in the environment, but should include also some knowledge of the amount of guilt and repression that are present and whether these have taken shape as neuroses, reaction formations or partial unsuccessful sublimations The latter necessitates the use of a modified technic of child analysis With this B Glueck (Inter Cong Ment Hyg (May) 1930) agrees

Susan S Isaacs (Brit J M Psychol 8 186 (Nov) 1928) points out that if ordinary parents regard the behavior of a child of 2 or 3 as a little abnormal, that child usually is a very sick child She points out that certain symptoms which are pleasing to parents—docility, extreme tidiness, over-preciseness, dislike of being dirty, meticulousness, kindness, sensitive lack of cruelty, ritualistic prayers, frequent endearments and show of affection, offering gifts to older and stronger children, and an ardent de-

sire to be good or clever—are really the indications of deep neurotic guilt and anxiety. An intense desire to model the self on the parent or precociousness in learning to write or read may indicate a too repressive superego

J S Plant (J A M A 93 1939 (Dec 21) 1929) in discussing sex difficulties of children, divides the child's sexual interests and development into 3 periods

1 *Birth to entrance in school* This period has 2 types of sex problems (a) rubbing of the genitals which becomes persistent and accentuated by parental anxiety, social taboo and less often from local irritation The biggest feature in treatment is reassurance of the parents (The reviewer's cases of masturbation in young children have always been in families of outstanding unhappiness and maladjustment They must be treated by directing the major part of therapy to the parental problem), (b) desire for information Replies to such questions depend for their effectiveness less on actual information than on the parent's ability to discuss the questions freely and without expressing in any way the feeling that such topics are shameful

Ferenczi states that sex education by using illustrations from the animal and vegetable kingdom is valueless, because it does not give the child any indication of the pleasurable of the sex act, and this aspect is of importance for his development He re-emphasizes the trauma to the child from the sight of parental intercourse

2 *A social period*—from the entrance to school until adolescence The sex problems are those of dirty words and homosexual and heterosexual acts of

investigation The drive toward this behavior is largely from the interest existing in anything that is hidden and under a social ban Such words and acts can be desensitized immediately when the child learns that they can be discussed without moral implications This is best done by someone outside the family circle

3 *Adolescence* Masturbation, homosexual acts, exhibitionism and active presence of the opposite sex are the usual problem behavior The therapy must be to consider the act as a symptom, not important in itself Full and free discussion of sex matters by the child with a disinterested person is most helpful No matter how perverted the act may seem to be, if the phantasy accompanying it is heterosexual the outlook is good If the phantasy is homosexual, or if little or no phantasy is present, there is need of treatment by a specialist The child who is happily adjusted in school and at home does not find his sexual adjustments a pressing problem

J V Treynor (J Iowa M Soc 19 451 (Oct) 1929) maintains that the belief that every child regardless of his emotional, physical or intellectual capacity must have identical educational opportunities is producing a condition characterized by nervousness, anxiety, restlessness, irritability, poor appetite, insomnia, night terrors (all accentuated by the approach of any school crisis such as examinations) which he terms *school sickness* The treatment consists in an analysis of the situation—physical condition, school, home control and outside activities—and attempting to eliminate or compensate for the disturbing elements

P Blanchard (Ment Hyg 2 772

(Oct) 1928) states that deficient ability to read results from undiscovered visual defects, emotional conditionings in early years of school life, inadequate teaching in the early grades or changes from one pedagogical method to another during the early learning period The disability leads to failures in school and these to a feeling of inferiority which is apt to produce personality and behavior deviations—day dreaming, over-sensitiveness, inattention, lack of interest, absentmindedness Treatment is by special methods of individual instruction, designed to build up the deficient parts of the reading process as revealed by diagnostic tests

**SOMATIC FACTORS.**—L A Lurie (A J Psychiat 9 285 (Sept) 1929) states that endocrinopathies affect behavior in 2 ways (1) directly, as in cretinism or pituitarism (sluggishness, etc), (2) indirectly, when the endocrinopathic changes make the child feel different from the group, and expose him to ridicule from which he develops feelings of inferiority If the child is examined early enough the endocrinopathy may be treated directly—if later the treatment is that of the personality deviation

H C Cameron (Brit M J 1 185 (Feb 2) 1929) feels that the nervous child is peculiarly liable to derangements of metabolism, especially to acidosis This disordered metabolism increases his restlessness, irritability and nervousness Treatment for the acidosis may be helpful as an adjunctive measure

**EFFECT OF PARENTAL ATTITUDES.**—Many authors among whom may be mentioned B Glueck (Ment Hyg 12 722 (Oct) 1928), G H

Preston (*ibid* 751), F. Neumann (*ibid* 742), V. C. Branham (*loc cit*), S. Ferenczi (Brit J M Psychol 8 1 (Apr) 1928), D. Thorn (Internat Congr Ment Hyg (May) 1930), F. H. Allen (Ment Hyg 14 1 (Jan.) 1930), emphasize the importance in the production of behavior difficulties and personality deviations in children, of parental attitudes to the child. As Ferenczi points out, the real injuries to a child's personality occur during the period of training by the parents, and the most important of these occur at weaning, training in cleanliness and against "bad" habits. Improper methods of weaning may cause serious difficulties in the child's relation to objects and his modes of obtaining pleasure. Training in cleanliness has an important bearing on character formation and produces difficulties because parents often wish to exterminate primitive urges, as if they were bad in themselves, whereas, if they are led into more acceptable channels they can be utilized for the good of the individual and of society. Parental training methods are harmful to the child in inverse ratio to the extent to which the parents understand themselves and their ways of reacting to such childish situations (these ways being an outgrowth of their own experiences in habit training in childhood). Not only are such biased attitudes harmful to the child's personality but the latter also suffers as a result of parental discords, parental preferences and dislikes and the other ways in which parental personality maladjustments are manifested in the parents' behavior.

It would seem that the most important factor in the mental hygiene of childhood lies not so much in the

parents' *knowledge* of proper methods of training and handling of children, but in their *capacity* to apply these methods in a constructive manner. This capacity is dependent on the maturity of the parents' personality and their freedom from emotional conflicts.

#### BERIBERI.—ETIOLOGY.—

T. Ogata, S. Kawakita, H. Oka, S. Suzuki and S. Kagoshima (Deutsche med Wchnschr. 50 527 (Apr 25) 1924) are convinced there is a pronounced difference between beriberi and vitamin B deficiency. The argument which has caused considerable controversy has arisen from the fact that beriberic symptoms have developed in hitherto normal individuals following a diet deficient in vitamin B and the disappearance of those symptoms when an adequate diet was given. Although the livers of normal and avitaminose hens presented a definite decrease in the vitamin B content after feeding with rice, specimens from humans failed to reveal any decrease in the vitamin B content. Thus they believe human beriberi is not a true avitaminosis as shown by the normal vitamin B content of the body. They suggest that possibly beriberi may be the result of an abnormal proliferation of the saprophytes within the intestine, in consequence of a vitamin B deficiency, with the consequent formation of some toxic substance.

**DIAGNOSIS**—Spasms and ataxia or disturbance of consciousness are never observed in beriberi and are practically always present in vitamin B deficiency. Tachycardia, cardiac hypertrophy and congestion are present in beriberi, while in rice disease

there is cardiac atrophy with a retarded pulse. Anasarca is frequent in beriberi and only occasional in vitamin B deficiency. Hyperglycemia is characteristic of rice disease, but not of beriberi, and in the former there are extensive changes in the erythrocytic picture. The hemorrhagic diathesis occurs in avitaminosis, but is never seen in beriberi.

G C Shattuck (Am J Trop Med 8 539 (Nov) 1928) draws attention to the association of beriberi, pellagra and scurvy all developing on a basis of faulty nutrition. Predisposing factors which contribute to the development of beriberi are chronic malaria, pregnancy, climatic heat and moisture, bad hygiene and other debilitating conditions. Polyneuritis is frequently associated with chronic alcoholism, diabetes, cancer, tuberculosis, syphilis, pregnancy and marasmus of infants, but the fact that polyneuritis is not a common disease in the United States precludes the sparsity of beriberi in this country. There being no known criteria for the diagnosis of beriberi, the therapeutic test is of value in acute cases, but in long standing cases where there is far advanced degeneration of the nerves and muscles, such a procedure is worthless. Circulatory disorders with cardiac hypertrophy and dilatation in a case of polyneuritis suggest beriberi. In the Far East faulty nutrition is particularly common in infants, and cases of beriberi develop mostly in breast-fed infants as a result of deficiency of the diet of the nursing mother, even though she herself may not show definite signs of beriberi.

**TREATMENT**—A H Wells (Philippine J Sc 19 67 (July) 1921) describes in minute detail the method

of preparation of *tiqui-tiqui* an extract made from the rice polishings. He states that the Public Welfare Board in March 1921 required 10,000 bottles of this extract monthly. Many organizations and the Philippine Health Service were purchasing the products of local druggists to fill their requirements. Analyses have shown that they contain glycerine, sugars, inactive substances and a high percentage of alcohol. A plant with the capacity for the production of 15,000 bottles per month throughout the Philippine Islands would permit the carrying out of a plan of treatment of beriberi and within one year would show a definite decrease in the infant mortality from this disease.

**BILIARY TRACT.—OPERATIONS ON**—The reconstruction of the common bile duct, using a transverse pedicled flap of duodenum, so as to produce a valvular union, is described by A J Walton (Surg, Gynec and Obst 49 526 (Oct) 1929). Of 24 reconstruction operations, 9 were terminal with 2 deaths and 2 failures with return of the obstructive jaundice. Of 12 patients with lateral reconstruction, 6 died from the operation, 3 having carcinoma. Of the 6 who recovered, 3 had carcinoma of the duct, from which they died later, 3 had obstruction due to chronic pancreatitis associated with conditions preventing the performance of cholecystoduodenostomy and remained free from symptoms for from 3 to 6 years after the operation. Terminal reconstruction is used where there is insufficient length of the remaining portion of the biliary duct for a lateral anasto-

mosis The duodenum is anchored close to the duct and a short portion of rubber tube fastened into the duct by a plain catgut suture. The narrow transverse flap of duodenum is raised, the underlying opening closed to a point just permitting the rubber tube to enter the duodenal lumen, and the flap sutured over the tube. The wound is closed with a small tube drain which is partially withdrawn on the second day and removed on the fourth day if no bile escapes

Two hundred consecutive surgical lesions of the biliary tract are reported by W. A. Sherwood (Ann Surg 88 178 (Aug.) 1928). About 65 per cent of the patients had *gallstones*. The presence of stones was demonstrated in only about 22 per cent of those subjected to x-ray examination. *Malignant disease* was present in 4 per cent, *obstruction* of the common duct with jaundice, in 5 per cent. **Cholecystectomy** was the usual operation of election. **Cholecystostomy** was done in 11 acute cases as an emergency measure, with the feeling that it should be more frequently used in the acute, bad-risk type of patient, reserving, if necessary, the more radical operation for a later time. Bacterial infection was often absent and when present, seemed to be a complication or late result rather than a primary lesion. The danger of peritoneal infection or acute inflammations of the gall-bladder is much less and quite different from an acute appendicitis. Permanent relief of symptoms after operation was usual where there was absolute obstruction or colic from stones or other mechanical cause, while vague digestive disturbances often ascribed to chronic infection of

the gall-bladder, associated with slight fibrosis or involution atrophy, constitute a type in which operation often fails to give relief from symptoms. Sherwood believes that cholecystectomy is too frequently done upon patients of this type. He considers it safer to permit the average acute gall-bladder condition to subside before an operation is undertaken. In suspected biliary tract disease, sufficient time should be allowed for diagnostic studies and the determination of the factor of safety. Poor operative risks may be converted into comparatively safe ones, and the indicated procedure may then be done at the best time for the patient. Sherwood believes that the primary factor in the *etiology* of *cholelithiasis* is a disturbance of body chemistry in relation, particularly, to cholesterol and calcium metabolism. Gradual occlusion of the cystic duct by a stone usually results in mucous hydrops of the gall-bladder. Sudden occlusion causes marked edema and hemorrhage into the cavity or between the layers of the wall. Repetition of this process causes fibrosis of the wall. First, there is interference with the venous circulation, and when the condition becomes more severe, the arterial supply is impaired, and partial or complete infarction or gangrene occurs.

In a follow-up study of 62 patients operated on for biliary disease, J. Verbrugge (J de Chir 26 191, 1927) found that all the patients had a history of severe *colic* and an acute attack of pronounced and persistent *dyspepsia*. Forty-four, or 70.9 per cent were cured, 12, or 19.3 per cent, were much improved, and 6 or 9.3 per cent, were not improved. The best

results were obtained in patients with a history of biliary colic but without infection of the biliary system and without associated lesions, while the less typical the history, the less likelihood there was of a good result. Results were not good in angiocholitis, especially when not associated with stones, and were uniformly poor in cases with an unsatisfactory general state, such as obesity, visceroptosis, infection of the biliary tract, hepatic insufficiency, or associated lesions, as ulcer of the stomach and duodenum. The *prognosis* was always better in earlier and in the more acute cases than in cases of long duration with less prominent symptomatology. There was *recurrence* in 16 per cent, which the author believes was due either to stones overlooked at the operation or to migration of newly formed stones. Some cases of colic were possibly due to spasms of the biliary passages, to pancreatitis, to spasms of the sphincter of Oddi, or to adhesions.

R. B. Cattell (Ann Surg 89 930 (June) 1929) also presents the end-results obtained from an analysis of 634 cases of disease of the biliary tract in which operation was performed. **Cholecystectomy** has been considered the operation of choice for *gall-stones* and for acute *chronic cholecystitis* except in the very poor risk. Less than 30 per cent of patients having **cholecystostomy** were relieved over a long period of time. The mortality after gall-bladder operations is appreciably increased by doing other abdominal or pelvic operations at the same time. The operative mortality in patients with common duct stones is high. A considerable number have recurrence of symp-

toms, which results in a high subsequent non-operative mortality. Two deaths occurred in the last 275 consecutive operations on the gall-bladder and ducts, exclusive of those for malignant growths and stricture. Both of these patients had common duct stones. Exploration of the common duct should be done more frequently than is generally practiced. This procedure does not raise the mortality. Failure to obtain relief after operation for chronic cholecystitis is usually due to incomplete or erroneous diagnosis. Some of these patients have functional disorders of the colon.

Of 680 operations on the biliary tract studied by J. Petermann (Arch f klin Chir 153 1, 1928), 85 per cent were completely relieved of their symptoms, 10 per cent had mild symptoms, and 5 per cent were not benefited. Hernia occurred in the incision in 6 per cent. This complication is best avoided by making an oblique incision. Re-operation was necessitated by adhesions in 5 cases. True recurrence of stone in the common duct occurred in 3 cases, stenosis of the common duct in 5, including 2 from carcinoma. Biliary fistula occurred in 8, in 2 the common duct was sutured and an omentoplasty was done, in 1 the common duct was anastomosed to the duodenum and in 1 case the entire fistulous tract was implanted into the stomach. Petermann also points out that the more marked the symptoms and findings, the better the results of operation. There are many nervous patients with vague symptoms who are not benefited. In cases of definite stasis and cholangitis, the instillation of 20 per cent **magnesium**

sulphate through the duodenal tube should be done before operation. **Choledochoduodenostomy** was performed in 24 cases, with good results in some. The capsule of the pancreas is thickened, and Petermann splits the capsule.

G Pieri (J de chir 30 260 (Sept) 1927) advocates a **transverse incision** in operations upon the liver or biliary duct or for exploration of the upper portion of the abdomen. With the patient hyperextended over a sand bag or elevator, an incision is made from the end of the right tenth rib extending 2 finger breadths or more to the left of the midline. The recti are divided between a double row of sutures to prevent bleeding and retraction.

J Bakes (Zentralbl f Chir. 55 1858 (July 28) 1928) stresses the importance of **drainage** in biliary surgery. After ligating the cystic duct in cholecystectomy, he slips a small drainage tube over the ligature, and from this tube bile escaped in 230 of 346 cholecystectomies also in cholecystostomies. Two drains are used, 1 along the common bile duct and the other beneath the hepatoduodenal ligament. Whenever the common bile duct is opened, Bakes dilates the papilla with a specially made, olive-tipped sound.

On the other hand, H M Richter and L M Zimmerman (Ann Surg 88 187 (Aug) 1928) closed the abdomen without **drainage** in 262 of 400 operations on the biliary tract. Seven deaths occurred in these 262 cases, only 1 of which could be ascribed to peritonitis. With the 1 possible exception, the authors have yet to regret having closed the abdomen without **drainage**. The frequent drainage of

bile occurring after operations in which the incision is drained does not occur if the drain is omitted. Omitting the drain minimizes post-operative discomfort, reduces the incidence of infection-hernia, and shortens the post-operative stay in bed, stay in the hospital, and period of convalescence. For persistent liver oozing, a gauze pack is employed. In operations on the common duct a drain is used when accurate suture is impossible or there are other contra-indications to primary closure. In simple **cholecystectomy**, the mortality was 1.29 per cent, whereas in operations on the common duct it was 14.28 per cent. The mortality in cases where a primary closure was done was 2.68 per cent. With drainage it was 10.27 per cent, and, of course, the latter included the most difficult cases in point of risk. Retroperitoneal burying of the stump is considered undesirable as the peritoneum has more protective power than the retroperitoneal tissues.

J Petermann (Zentralbl f Chir. 55 2050 (Aug 18) 1928) emphasizes from personal experience that a perfect operative technic and intuition will determine whether **drainage** should or should not be employed, and yet surgeons of very great experience and ability such as Koerte always drain. To drain or not to drain is, therefore, largely a personal matter. With proper care of the stump of the cystic duct and of the bed of the gall-bladder, which should be thoroughly covered with peritoneum, and in the absence of stones and infection in any individual part of the biliary tract, Petermann feels it is not necessary to drain. He disagrees with Pribram in that he only

completely closes the abdomen if the gall-bladder bed is peritonealized, the liver bed is uninjured, and the cystic duct stump is satisfactorily closed and covered with peritoneum. He considers as extremely dangerous Pribram's recommendation, especially in the hands of inexperienced surgeons. Normann and Bier believe that the general abolition of drainage is impossible. The more marked the findings at operation, the better the final results, according to Petermann. Late symptoms may be due to pancreatitis, functional processes, typical duodenal ulcer, chronic appendicitis, or diseases of the kidneys and ureters. Only callous scars fixing the pylorus to the liver necessitate re-operation. Adhesion formation is reduced to the minimum by careful peritonealization of the gall-bladder bed with restriction of the use of packs. True recurrences are very rare.

**BIRTH INJURIES, INTRACRANIAL**—In late years the problem of fetal injury and fetal death, has been receiving, in increasing measure, the attention it justly deserves. In New York City, according to Polak, 1 baby out of every 21 is born dead, and 1 out of every 26 dies before it is 1 month old. It has been estimated, according to the Children's Bureau of the United States Department of Labor, that in this country the annual death rate of babies less than 1 year old, including stillbirths, totals 300,000. In the light of recent research, at least 50 per cent of these deaths may be said to be unnecessary.

Due to routine autopsies, much attention has been focused in the past few years on the question of

intracranial injuries and hemorrhage. Especially noteworthy are the contributions of Crothers, Ford, Ehrenfest, Holland, Poeck, Pierson, Schroeder, Sharpe and Schwartz. As a result of these investigations, a revision of one's conception of this important subject is necessary.

**CLASSIFICATION.**—It is customary to subdivide *intracranial hemorrhage* of the newborn into *extradural*, when it takes place between the bones of the skull and the dura mater, *subdural*, when between the dura and the arachnoid, *subarachnoid*, when between the arachnoid and the pia mater, and *intracerebral* when it occurs in the brain proper. The most important in the newborn, according to Blanco and Paperini, are the subdural or meningeal, and the subarachnoid, which may be supratentorial or infratentorial.

**INCIDENCE**—Almost one-half of all infants who are stillborn or die within the first few days, show, at autopsy, a laceration of the dura mater or tentorium. According to Holland and his co-workers (Med Research Council, Brit Emp Special Rep Sec No 100), tears of the tentorium occur in 50 per cent of all the cases of forceps and spontaneous breech labors, exceeding by far the percentage of infant deaths caused by maternal or fetal diseases.

P. Schwartz (Ergebn d inn Med u Kinderh 31 165, 1927), in the Pathologic Institute at Frankfurt, demonstrated *hemorrhages in the brain* (outside the known and fairly common pial and tentorial hemorrhages) evident macroscopically in 65 per cent of all infants up to 5 months. He also discovered necrotic or fatty degenerated areas which he believed



to be due to labor. In premature infants and in infants with soft skull bone, the condition was especially prevalent, few infants failing to reveal at least some trace of these lesions, and hence these would appear almost physiologic. Tears were discovered especially after face, brow and breech presentations. Papers published in almost every land, emphasize intracranial hemorrhage as the chief cause of fetal death, indicating at the same time that the actual incidence of intracranial injuries is much higher, since all dural tears do not result in a fatal hemorrhage.

Stern and Schwartz examined 100 infants in the first 10 days of life and found in most of them alternating periods of horizontal *nystagmus*. According to H. Ehrenfest (J. A. M. A. 92:97 (Jan. 12) 1929), this condition can be observed in 35 per cent of all babies born after normal labor, the incidence rising to almost 80 per cent in the first born, and to 100 per cent in those with abnormal presentation.

Stocker examined the eyes of 22 babies born by Cesarean section, and he failed to find any retinal hemorrhages such as are seen in babies born per vaginam. Schwartz (*loc cit*) found *retinal hemorrhages* immediately after delivery in more than 12 per cent of infants. These observations, however, may not be actual proof of intracranial hemorrhage.

Reports have appeared of fatal *intracranial hemorrhage* after Cesarean section, especially in the case of the low cervical, due to hurried extraction through a small uterine incision. Intracranial injury, however, does not necessarily reflect on the accoucheur's skill, as some of the hemorrhages are

physiologic and symptomless, and serious intracranial injury is often found in apparently normal deliveries.

**ETIOLOGY.—1. COMPRESSION**—On account of the sutures and open fontanelles on an infant's skull, the brain and meninges are to a certain extent exposed, moulding of the head causes a compensatory elongation of the skull in the opposite direction and an uneven distribution of the blood within the cranium, with possible tears of the dural folds.

**2. NEGATIVE PRESSURE**—Suction effect of a negative pressure exerted by the outside atmospheric pressure on the head presenting in the dilated cervix with ruptured membranes, may also produce small intracranial hemorrhages, according to Schwartz (*loc cit*).

**3. PREMATUREITY**—Due to the soft cranium and the fragility of the blood-vessels, premature infants are especially prone to intracranial injury.

**4. BREECH DELIVERIES**—The occipital bone may be pressed against the symphysis and endanger the tentorium and cerebellum.

**5. ANESTHETICS**—Ethylene, especially, prolongs the bleeding and coagulation time and may predispose to hemorrhage.

**6. HEMORRHAGIC DIATHESIS**—This is advanced by Cruickshank, but denied by Ehrenfest (*loc cit*). Serious hemorrhage may result, however, from delay in blood coagulation.

**DIAGNOSIS**—Several contributions have been added to aid the obstetrician in diagnosis. The symptomatology may be conveniently divided into antenatal and postnatal.

**1. ANTENATAL**—Antenatal changes in the rate, rhythm and force of the heart are to be noted. A retardation

to below 100 beats per minute points to danger in most cases

2 POSTNATAL —(a) *Asphyxia* — The presence of dysphagia with asphyxia has been directed to our attention as indicative of intracranial injury. It must be remembered, however, that asphyxia is not necessarily responsible for intracranial damage. On the contrary, Heidler has shown that asphyxia is often an aftermath of intracranial injury and should be treated with utmost gentleness.

(b) *Intermittent Cyanosis* — N. W. Clein (Am J Dis Child 37 751 (Apr) 1929), in necropsy studies upon 36 premature infants, found that 18 had intracranial hemorrhages situated beneath the tentorium, usually over the superior surface of the cerebellum and in the cerebellopontine angle. The striking symptom in all of these had been intermittent cyanosis, the attacks occurring usually during the first to the third days of life and again from the seventh to the eighteenth day, if the infant survived that long. This symptom was noted in only 1 infant who did not have infratentorial hemorrhage and it was not seen in the infants who lived. In 9 of the 18 infants with infratentorial hemorrhage there was also supratentorial hemorrhage, usually localized over the parietal lobes.

When a second series of attacks of cyanosis occurred from the seventh to the eighteenth day in an infant that had intermittent cyanosis during the first 3 days of life, infratentorial hemorrhage was found associated with infection.

In 3 infants with intracranial hemorrhage which was entirely supratentorial, none had exhibited intermittent cyanosis during life.

(c) *Spinal Puncture* — The investigations of W. Sharpe and A. S. MacLaire (J A M A 86 332 (Jan 30) 1926), who performed 500 lumbar punctures on newborn infants, revealed bloody fluid in 9 per cent. One must be careful not to overstress the importance of this finding, since the cramped position of the infant may increase the venous congestion around the already rich venous plexus within the spinal canal. On this account, Levinson advises a cisterna puncture to avoid contamination. One must consider that if the hematoma does not drain into a ventricle or the subarachnoid space, the spinal fluid will not show blood. Routine spinal puncture with cautious interpretation is advised.

The significance of the presence or absence of blood in the cerebrospinal fluid was studied by J. Glaser (Am J Dis Child 36 195 (Aug) 1928) in a series of 100 premature infants. The high mortality of 81 per cent in this series was due to the inclusion of as many cases as possible of intracranial hemorrhage. Necropsy was performed in 70 of the 81 infants that died. Of the total of 70 cases, 54, (74 per cent) showed blood in the spinal fluid during life or immediately after death. Sixty-two per cent of the fluids that on gross examination were free from blood were found on microscopic examination to contain erythrocytes.

Macroscopic evidence of subarachnoid or subpial hemorrhage was revealed in 26 infants (36 per cent). In 7 of these, however, no blood was found in the cerebrospinal fluid. The absence of blood in these infants in whom necropsy revealed gross hemorrhage, indicates that subpial hemorrhage may be present and may fail

to manifest itself by free blood in the spinal fluid because the blood is confined beneath the pial membrane

In 42 infants, no macroscopic evidence of intracranial hemorrhage could be found. In 13 of these, the fluid was grossly bloody. The presence of erythrocytes in the infants in whom necropsy failed to disclose gross hemorrhage is evidence that the finer vessels of the pia-arachnoid may be injured without the production of grossly recognizable hemorrhage

From the frequency with which blood and its derivatives occur in the cerebrospinal fluid of premature infants, Glaser (*loc cit*) concludes that some degree of intracranial hemorrhage is physiologic. But the fact that subpial hemorrhage was so pronounced as to cause the death of 37 per cent of premature infants establishes the importance of this pathologic process as a menace to the life of the newborn

(d) *Dandy's Encephalography*—This consists in the injection of air through lumbar, cisternal or ventricular punctures. More recently, myelography has been employed

(e) *Abnormal Hemogram*—According to Dollinger, when this occurs in the infant immediately after birth, it is a definite expression of blood destruction

(f) *Tapping the Sternum*—Ylppo records that tapping of the sternum will produce flash-like stretching and abduction of the extremities in traumatized premature infants

(g) *Miscellaneous*—Various signs are emphasized such as disturbed respirations, atelectasis, persistent hiccough and vomiting and facial nerve affections, resulting from the

tearing of vessels near their entrance into the longitudinal sinus

**PROGNOSIS.**—Hemorrhage in the craniovertebral cavity does not necessarily injure the brain. Dollinger, however, claims that even a minute intracranial hemorrhage may create a weak spot for inflammation or toxemia, later on in life. Congenital hemiplegias, monoplegias and spastic paralyzes are believed today to be true birth palsies. It is necessary to be certain, however, that these phenomena are not of intrauterine origin

Frequent pathology is also noticed later. Ylppo found in a large series of premature babies, that 7 to 8 per cent. were imbeciles and idiots, and also that 40 per cent of those who had convulsions in the first 2 years of life, later showed signs of mental deficiency. Smith reported 50 cases of birth injuries in which 62 per cent remained mentally defective

**TREATMENT**—1 **PROPHYLAXIS**—Proper prenatal care to prevent the birth of premature or immature infants is urged. The early recognition of malposition and malpresentations is essential. Hurried extraction, especially in breech cases, is to be avoided. Where intrauterine asphyxia is due to insufficient oxygen, *e g*, in cases of prolapsed cord or placenta previa, prompt delivery is indicated, if due to brain injury, this is contraindicated.

Frey claims that chloroform may overcome threatened intrauterine asphyxia by relaxing the uterus. The inhalation of ether for 2 or 3 minutes, as well as cardiac stimulation for the mother, has been recommended. Seidentopf influences the fetal heart tones *in utero* in cases of asphyxia by injecting atropin or amyl nitrite, intravenously

No attempt should be made to extract a baby through too small a vaginal opening (overcome by episiotomy), or through too small a uterine or abdominal incision

Warning is also issued against a forceps application which may increase a compressed diameter of the infant's skull

Careful extraction of the after coming head in breech deliveries is urged by Piper who has devised a special pair of forceps to assist, obviating forced traction on the vertebral column and enabling the obstetrician to exert proper traction downward and backward Ehrenfest (*loc cit*) urges in breech deliveries, mild pressure on the head from above, as causing better flexion and reducing the amount of traction from below This force should be exerted obliquely, instead of straight downward

Attempts to induce premature labor for pelvic dystocia are condemned, because of the recognized danger to the premature baby Ulrich, however, calls attention to toxemia as the most frequent cause of premature labor, and as a blood destroying disease responsible for hemorrhage in the newborn Babies born of toxic mothers will act in the same way as babies born after a long labor with severe pressure It follows that attention to toxic symptoms in the mother is an important phase of prevention

The danger of the Schultze method of resuscitation in causing dural injuries, has been brought to the fore

**2 ACTIVE TREATMENT**—(a) Repeated lumbar punctures are advocated especially by Sharpe (*loc cit*) One might question, however, whether

lowering the intracranial pressure might not favor more hemorrhage

(b) *Treatment of Asphyxia*—According to Yandell Henderson (J A M A 90 583 (Feb 25) 1928), asphyxia involves both low oxygen and low carbon dioxide content in the infant's blood and tissues Compression of the head with a decrease of the supply of blood to the brain during labor, depresses the respiratory center so that after delivery the center does not receive a chemical stimulus sufficient to overcome this depression He, therefore, suggests a simple and safe form of infant **inhalator**, consisting of a cylinder filled with **oxygen** and 5 per cent **carbon dioxide**, with a mask of convenient size for the infant's face

Mathiew and Holman recommend a **tracheal catheter** to place the mixture of **carbon dioxide** and **oxygen** where it may be used by the infant, first employing **suction** to extract the mucus from the larynx and upper trachea

Flagg uses a special **laryngoscope** All strenuous attempts at resuscitation are to be avoided, due to the danger of increasing the intracranial injury

(c) *Therapy*—Subcutaneous injections of 30 c c (1 ounce) of the **mother's blood** is advocated as a routine

(d) *Surgery*—Surgical interference is justified only in extreme cases of fracture which cause depression of the cranial bones

**BISMUTH.—PREPARATIONS AND ADMINISTRATION**—R N Chopra, J C Gupta and M N Mullick (Indian M Gaz 63 361 (July) 1928) remark that the older preparations of bismuth were not suitable for injection, but

only for oral administration, but that during the past decade several new compounds have been prepared with the view to employing them intravenously or intramuscularly. The insoluble compounds, though not so painful as the soluble, are not absorbed quickly and regularly, and so give rise to the danger of cumulative poisoning. Intravenously, bismuth compounds produce agglutination and hemolysis of the erythrocytes, and even such compounds as the colloidal preparations may produce severe reactions or symptoms of colloidal shock. B. C. Ghose (cited by Chopra *ibid*) has prepared an organic aromatic compound, called "*bismene*." It is a sodium salt of para-amino-phenyl-bismic acid in combination with urea, and contains 50.1 per cent of bismuth. This salt is freely soluble in water (15 per cent at 33° C), giving a clear, brown, slightly acid solution ( $pH = 5.9$ ), which is not decomposed by boiling. It has low toxicity, and gives no untoward effects when given intravenously. The authors have used this preparation with striking results in frambesia, and are now trying it in syphilis and filariasis. Four cases of frambesia are reported in which the lesions cleared rapidly and the general health improved considerably after 4 injections given intravenously at weekly intervals, using doses of 0.05, 0.1, 0.15 and 0.175 Gm ( $\frac{3}{4}$ ,  $1\frac{1}{2}$ ,  $2\frac{1}{4}$ ,  $2\frac{3}{4}$  grains).

G. R. Wilkinson and I. S. Barksdale (South M. J. 21:914 (Nov.) 1928) have shown that *bismuth violet*, a dye, has marked bactericidal value *in vitro* with *Staph. albus*, *Staph. aureus*, *Strep. pyogenes*, *B. coli communis*, *B. typhosus*, *B. paratyphosus* A and B, *B. anthracis* and *B. pyocyaneus*. *In vitro* Gram-positive organisms are more readily killed than the Gram-negative. The toxicity of bismuth violet is quite low. The drug has been of definite value in the treatment of certain acute and chronic infections, such as varicose veins and infected wounds.

**PHYSIOLOGICAL ACTION**—It has been determined by H. G. Mehrrens, P. J. Hanzlik, D. C. Marshall and N. S. Brown (J. A. M. A. 91:223 (July 28) 1928) that intramuscular injections of bismuth in dextrose solution, or potassium tartrate or salicylate in oil, cause definite and prompt diuresis in human subjects. The action is

due to the bismuth ion, and in ordinary doses produces no demonstrable injury to renal functional efficiency. Oral administration of from 3 to 5 Gm ( $\frac{3}{4}$  to  $1\frac{1}{4}$  dram) of bismuth subnitrate may cause an increase in diuresis, although the action is unreliable. Any diuresis after oral administration is probably due to a nitrite action as indicated by the absence of bismuth excretion. The results with bismuth intramuscularly clearly indicate its trial in the treatment of clinical edemas.

**ABSORPTION, DISTRIBUTION AND ELIMINATION**—M. L. Boyd (J. A. M. A. 93:269 (July 27) 1929) demonstrates by roentgenograms in 11 cases that potassium bismuth tartrate is satisfactorily absorbed, if given in proper doses, at the proper interval, with the proper technic, and with suitable massage of the buttock immediately after the injection and then daily or several times daily throughout the course of treatment. When the needle is inserted it is free of water, so that in case the end is in a vein, the blood can be made to flow back into the syringe the more readily.

C. S. Leonard and A. F. Seibert (J. Pharmacol. Exper. Therap. 34:355 (Dec.) 1928) state that bismuth can be detected in the blood of the dog within 2 hours after its intramuscular injection, provided the site of the injection is massaged. If not massaged, the appearance of the metal is delayed 24 hours. The maximum concentration ranges from 0.001 to 0.003 mg per c.c. (using 40–50 mg of bismuth per kilo). Detectable amounts of bismuth are present in the blood for several weeks after the injection. The concentration of bismuth in 24-hour urine specimens is consistently higher than the blood concentration in the same animals.

J. A. Sultzberger and O. M. Gruhzit (Am. J. Syph. 11:103 (Jan.) 1927) studied the rate of absorption, distribution in the body and elimination of a new soluble sodium bismuth thioglucolate compound in dogs. Absorption from the site of injection is complete in about 2 hours. It remains in the blood stream about 72 hours. Every organ and tissue in the body was reached at the end of 6 hours. More was deposited in some than in other organs, except the kidneys and the spleen. It appears that

bone is a storage place for bismuth. The elimination of bismuth in the excreta of animals reached an average of 29.7 per cent in 48 hours and 32.7 per cent in 72 hours. About 65 per cent of the eliminated bismuth was found in the urine and about 35 per cent in the feces.

C. S. Leonard (J. Pharmacol. and Exper. Therap. 34:333 (Dec.) 1928) states that 24 hours after the intramuscular injection into the rabbit of a dose of soluble potassium bismuth tartrate, lethal to rabbits, the average order of distribution of bismuth in the organs (totals) is as follows: Kidneys (highest), liver and lungs, followed by a varying order for the other visceral organs.

The elimination of bismuth from the human organism has been studied by W. Engelhardt (Arch. f. Dermat. u. Syph. 156:1, 1928). The elimination is rapid, following intravenous injection. This fact, together with the necessarily more frequent injections, the great toxicity, and the needlessness of excessively rapid bismuth effect as a spirillicide leads the author to deprecate intravenous use. The best eliminated products are the vegetable oil suspensions of iodine and quinine, containing bismuth salts.

**UNTOWARD EFFECTS**—J. A. Gammel (Arch. Dermat. and Syph. 18:210 (Aug.) 1928) demonstrates local accidents following intramuscular injection of bismuth salts. Sections taken 5 days after the injection show the crystals and granules within the vessels, and a marked infiltration of the tissues with polymorphonuclear leukocytes, lymphocytes, endothelial cells and plasma. He says that this is the first time in the United States that crystals were demonstrated within arterial blood vessels following the administration of heavy metal salts as used in the treatment of patients with syphilis.

**BLADDER.—CALCULI.—Treatment**—In a discussion of stone in the bladder, H. Cabot (J. A. M. A. 91:1968 (Dec. 22) 1928) suggests that in borderline cases, litholapaxy should be tried before the bladder is opened.

**Colpocystotomy** for the removal of stones and foreign bodies is suggested

by E. Sonntag (Zentralbl. f. Chir. 55:450 (Feb.) 1928). The author states that in this procedure the danger of eventration or of wounding the ureter or sphincter, is not present.

**RUPTURE**—Rupture of the bladder is discussed by I. R. Sisk and J. B. Wear (J. Urol. 21:517 (Apr.) 1929). Since 1900, twenty cases of spontaneous rupture are reported in the literature. The authors state that in the extraperitoneal type of rupture the prognosis is very favorable, whereas in the intraperitoneal type it is very grave, unless operation is done within 36 hours.

**SYPHILIS**—That syphilis of the bladder is not rare, is the contention of Chocholka (J. d'urolog. 25:513 (June) 1928), who reports 11 cases of his own. He has observed 57 cases in the past 12 years. Likewise, B. Nikitin (Zentralbl. f. Chir. 55:660 (Mar. 17) 1928) reports 2 cases in which diagnosis was made from the end-results of treatment.

**TUBERCULOSIS**—Primary tuberculosis of the bladder is discussed by A. Romani (Arch. ital. di urol. 4:201 (Feb.) 1928). The author reports a case which came to autopsy and the diagnosis was confirmed. The author believes that primary tuberculosis of the bladder may remain localized for years and, if treated early, may be cured.

**TUMORS**.—In a detailed discussion of malignant tumors of the bladder and prostate, H. H. Young (Am. J. Surg. 6:667 (May) 1929) concludes by urging the importance of an early diagnosis. The author is convinced that not only has surgery made great strides, but that the greatest benefit has been obtained by the use of endovesical treatments by high frequency

electrical applications, and the use of radium, with or without the use of the cystoscope

**BLEPHAROSPASM.**—E. S. Gurdjian and H W Williams (J A. M A 91 2053 (Dec 29) 1928) report 3 cases of blepharospasm in which no cause could be determined for the condition. The first was treated by neurectomy followed by the injection of alcohol. In the others the treatment consisted in the non-operative injection of alcohol into the upper branches of the facial nerves. In the first case there was complete relief lasting for 6 months and the treatment was repeated successfully on the return of the symptoms. In the 2 other cases the symptoms were relieved incompletely but satisfactorily.

The cause of the blepharospasm should be carefully searched for, and before resorting to surgery the nasal accessory sinuses and teeth should be excluded. Correction of refractive errors and motor anomalies should not be overlooked before resorting to more radical measures. A Terson's (Ann d'Ocul 166 89 (Feb) 1929) method of injecting alcohol into the eyelid should be considered. He injects 1 c c (16 minims) of 80 per cent alcohol in spontaneous entropion.

**ETIOLOGY**—O Orlandini (Gior med d Osp Civ di Venezia, 140 (Sept-Oct) 1927) records 2 cases of blepharospasm in sisters aged 22 and 16, and states that the causes of blepharospasm consist in a direct or reflex irritation or stimulation of the facial nerve in its peripheral portion, in its passage to its nuclei of origin, or, lastly, in its cortical motor center. The reflex causes of blepharospasm are chiefly irritation of the trigeminal

nerve, and consist in ocular or periocular trauma or inflammation of the eyeball and its adnexa (keratitis, conjunctivitis, ulcers, iritis, blepharitis, dacryocystitis, and so on), or in pathological excitability of the sensory tracts, especially in trigeminal neuralgia. Blepharospasm is found in occipito-cervical neuralgia, which radiates to the trigeminal nerve, and in retinal hyperesthesia due to disturbance of accommodation and errors of refraction. Lastly, the irritation may originate in a distant region, for example, in uterine disease and in the case of children suffering from intestinal worms.

Blepharospasm may arise from a direct cause, such as trauma in the region of the facial nerve, compression by tumors, caries of the petrous bone from otitis, and parotid abscess. Infectious diseases and intoxications, such as syphilis, alcoholism, and malaria, may also give rise to motor disturbances in the orbicularis. The etiological factor may be found in tuberculous meningitis, and diseases of the brain with irritation of the facial nerve by compression or a meningeal exudate. In other cases the origin of the blepharospasm cannot be determined, and therefore the motor disturbance is regarded as functional or dynamic. Blepharospasm is, in fact, ranked among the motor anomalies of neuroses and psychoses, such as epilepsy, chorea, and especially hysteria, in which it is usually found on both sides.

**BLOOD.—SEDIMENTATION TIME.**—This test is easily carried out and perhaps this is why such a large literature has accumulated rather than because any very definite

information is at hand concerning its mechanism

It seems fairly well established that comparisons of 2 or more tests on the same individual at different times are of more clinical significance than merely one estimation, although the latter may give valuable information. For quick bedside results, H Rothpletz (Schweiz med Wchnschr 59 676 (June 29) 1929) has suggested the following technic: 4 or 5 c c of blood are drawn from the cubital vein under slight stasis into 1 c c of sodium citrate solution in a small test-tube. The tube is left standing for an hour at a temperature of from 63° to 68° F (17.2° to 20° C). The column of clear plasma above the settled cells is measured with a millimeter rule. In healthy men, the maximum is 9 mm; in healthy women, 12 mm. In juveniles, the height of the column is about that of women. Naturally, the diameter of the tube is of importance, so the same size tubes are used for the comparison of patient and control. Other methods on a time basis are also available.

Many authors have reported studies of various conditions affecting the rate such as blood dilution, age, sex, temperature, exercise, ingestion of food, etc., but these factors have no influence of clinical importance. The consensus of opinion seems to be that when the rate of sedimentation is increased, there is something wrong with the patient in the nature of tissue destruction. It does not tell where the lesion is, nor its cause. For instance, it is increased in *appendicitis* and comparisons of several tests done at intervals indicate the course of the disease. In *tuberculosis*,

it seems to have great usefulness in distinguishing between activity and inactivity. W. H. O. Kapteyn (Nedrl Maandschr v Geneesk 15 329, 1928), says it is valuable in *tuberculosis of the bronchial lymph nodes* in which the temperature may remain normal.

In gynecological cases, the rate is increased in *suppuration of the adnexa*, but not in *extrauterine pregnancy* except when ruptured for some time and destruction of the blood has occurred. It acts as a guide in determining whether *salpingitis* is receding or progressing.

As C. M. Stimson and H. W. Jones (Am J Obst and Gynec 18 81 (July) 1929) remark, given a patient with a lesion in a definite place, *e g*, the adnexa, this does not exclude inflammatory changes and tissue destruction elsewhere (*viz*, the lungs) which will influence the sedimentation reaction—a point in favor of careful physical examination in all cases.

Finally, J. O. Polak and D. G. Tollefson (J A M A 90 168 (Jan 21) 1928) conclude it helps in the diagnosis of *pelvic conditions* (1) by indicating the proper time for operation, (2) by announcing onset and progress of complications after the first week, (3) by indicating the safe time for the discharge of patients. A low reading, means infection and a high reading excludes it.

**BLOOD SUGAR**—Carbohydrate absorption occurs at once following the ingestion of soluble carbohydrates, mainly from the upper parts of the small intestine, as shown by J. J. R. Macleod (Lancet 2 1 (July 6) 1929). As far as can be determined, no absorption of sugars normally occurs in the stomach. The amount of sugar



absorbed is constant for the various sugars provided sufficient sugar is given, but varies according to the time the animal was starved prior to giving the sugar. The blood sugar curve after ingestion of carbohydrates is very constant and any heightening or lengthening of the curve, which is obtained by plotting the blood sugar against time, is indicative of a diabetic tendency. It should be born in mind that numerous factors enter in to influence the behavior of the curves, for not only does this depend on the rate of intestinal absorption of the sugar, which again is dependent on many factors, but also on the rate at which the tissue uses the sugar that is absorbed. This disposal may be influenced in several ways, and there is accumulative evidence to show that these are largely controlled by the concentration of insulin in the blood. When the intestinal factor is eliminated, by injecting intravenously, the tolerance toward sugars may be determined by observing whether any is excreted in the urine.

Glycogen of the liver is familiarly known to represent a storage form of carbohydrate, but there are many well established facts which indicate that it is also, in a sense, an internal secretion. When food is withheld, the amount of glycogen in the liver rapidly becomes decreased and then increases again. It has been recognized that starvation alone does not cause all the liver glycogen to disappear and experiments have been presented to show that starvation, even with exercise, will not cause it to disappear. His results, which are of decided significance, show that the glycogen of the liver is of much greater metabolic significance than is

implied in the notion that it represents a storage form of carbohydrate.

In pathological conditions, it is questionable whether all traces of glycogen ever disappear from the liver. Repeated injections of thyroid for some time cause glycogen to almost disappear from the liver. It is not alone the percentage of glycogen in the liver that determines the readiness with which this organ may discharge sugar into the blood, but also the sensitivity of the glycogenolytic mechanism. It is interesting that as the glycogen disappears from the liver, free sugar increases and there is no increase in lactic acid, whereas in muscle there is no increase in free sugar, but lactic acid ultimately accumulates almost in proportion to the glycogen which has disappeared.

The storage hypothesis is entirely inadequate to account for the accumulation of glycogen in the liver. Epinephrine has been shown to have a reversible action, causing glycogen to be deposited in the liver when none is there, and to be broken down when an abundance is present. Insulin also exhibits similar reversible effects. Glycogen can be produced in the liver cells out of non-carbohydrate material by some sort of secretory process, and it can also be deposited in them by condensation of glucose, and other hexose monosaccharides, carried to the viscus by the blood.

*Glycemin* is the name given by O. Loewi (Klin. Wchnschr. 6:2169 (Nov. 12) 1927) to a substance behaving like most of the known hormones, in diabetic plasma. Experimentally, it has been shown that with diabetes, there is a dialyzable substance exerting a direct primary inhibition of glucose absorption by the

cells This substance (glycemin) is secreted by the liver alone The author comes to the hypothetical (to be sure) conclusion that in human diabetes, the excessive secretion of glycemin, hence the disorder of liver function, is the primary one, and the pathologic-anatomical alterations of the pancreas and its functional diminutions, the secondary

The *pituitary* effect on blood sugar is apparently exerted by mobilizing the glycogen supply of the liver (J Organotherapy 12 197 (Sept-Oct) 1928) It does not act through the sympathetic nervous system or the suprarenal glands That it acts directly on liver cells, perhaps in some way influencing the action of glycogenase and in converting glycogen to dextrose, is a possibility

*Anesthesia and operation* effects on glycemia investigated by E Mekie and H Miller (Brit M J 1 244 (Feb 9) 1929) show a high pre-operative level of blood sugar due to (1) acute infection, (2) peritoneal irritation, (3) shock and (4) nervousness Post-operatively, under general anesthesia, there is generally a hyperglycemia which bears a close relationship to the duration of the anesthetic

The *insulin effect* on the sugar tolerance test was done by F Moutier and L Camus (Arch d mal de l'app digetif 19 297 (Mar) 1929) on 120 patients Their results are of some interest, when 20 units of insulin were given with 50 Gm ( $1\frac{2}{3}$  ounces) of dextrose, the hyperglycemia was decreased 41 per cent in normal persons, 45 per cent in thin ones, 47 per cent in fat ones, and 54 per cent in diabetes, in comparison with the same test in the same person without insulin

**HYPERGLYCEMIA** —Hyperglycemia constantly follows *head injuries* of sufficient severity to cause loss of consciousness, according to H E Mock and G de Takats (Ann Surg 90 190 (Aug) 1929) which subsides within the first day or a few days Section of the splanchnic nerves in dogs abolishes this hyperglycemia, therefore, the sympathetic discharge originating in the higher center of sugar regulation is unable to reach the liver and mobilize the glycogen

Hyperglycemia in acute *pulmonary disease* has been shown by F Castelletti (Biochem e terap sper 16 317 (July 31) 1929) to occur in the 10 cases reported The blood sugar curves showed an early rise, which continued gradually with the extension of the disease, attaining a maximum corresponding with the crisis, and slowly declining to normal or below in the stage of resolution

Hyperglycemia in *gall-bladder disease* is reported by F Beinhart (Beit z klin Chir 144 158 (Aug 31) 1928) as important in explaining the etiology of disease of the pancreas Evidently, the infection was conveyed to the pancreas from the gall-bladder by the blood and lymph vessels The 2 cases reported were at first regarded as being diabetes mellitus with associated gall-bladder disease They were treated dietetically and with insulin, but without any result When the symptoms of the gall-bladder disease became prominent, **cholecystectomy** was done in both cases Soon afterward, the urine became sugar-free and the blood sugar became normal and remained so even after the administration of 50 Gm ( $1\frac{2}{3}$  ounces) of **dextrose**.

Primary *work* hyperglycemia ac-

cording to F A Nolte (Zeitr f. d. ges exper Med 66 566 (Aug 3) 1928), is a physiologic phenomenon, independent of the amount of work done, and is a symptom resulting from intense muscular exertion

*Agonal* hyperglycemia was found by J Neuburger (Deutsche med Wchnschr 55 1168 (July 12) 1929) to occur shortly before death in 19 cases with various diseases. He finds an increase of blood sugar is a sign of approaching death and may be found in the last stages of all diseases

*Bacterially induced* hyperglycemia was shown by C L Evans and I T Zeckwer (Brit J Exper Path 8 280 (Aug) 1927) after removal of the suprarenals to be due to central stimulation of the suprarenals by way of the splanchnic nerves with consequent glycogenolysis. After suprarenalectomy the bacterial injection caused a severe hypoglycemia unaffected by vagal section

**TREATMENT**—Diabetes in all forms should be given insulin, states P de Bersaques (Bruxelles méd 8 1570 (Sept 30) 1928), for the mild and medium cases, **synthalin** is of great value. Before giving a diabetic synthalin, a liver function test should be made. Hepatic insufficiency is a contraindication. While large doses of synthalin are toxic, this is noticeably reduced by simultaneous administration of **decholin**

**HYPOGLYCEMIA**—Hypoglycemia may develop, in diabetics and non-diabetics, in patients receiving small doses of insulin and those who never had insulin, as reported by B I Ashe, O Mosenthal and George Ginsberg (J Lab and Clin Med 13 109 (Nov) 1927). The symptoms may vary markedly, according to the

severity and type. In certain individuals hypoglycemic reactions manifest themselves though the blood sugar be at accepted normal levels. Inanition and abstinence from food are the most common causes for lowering the blood sugar

Of 307 routine studies, G H Hoxie and G M Lisherness (Am J M Sc 173 220 (Feb) 1927) have shown that 95 had a fasting blood sugar below 0.07 and of these latter, 50 showed a curve that did not rise above 0.12. They conclude that there is a condition in which the blood sugar is less than that spoken of as normal, which may exist for some time, and is accompanied by nervous and mental disturbances similar to the early symptoms of hypoglycemia. The cause is attributed to general depression of metabolism, overwork, debilitating disease and worries

*Relative* hypoglycemia is reported by J Lankhout (Nederl Jijdschr v. Geneesk 2 4902 (Oct 6) 1928) in a diabetic of 22 years' standing, whose fasting blood sugar was reduced from 0.400 to 0.216 Gm per 100 cc. At this point, he developed severe symptoms of hypoglycemia. The patient died and he suggests injury to the liver from previous infections as a cause for the peculiarity in this case

Hypoglycemia has been shown to exist in allergy by J T Malone (U S Vet Bur M Bull 5 285 (Apr) 1929), who advances the suggestion that an undetected liver hormone may be involved in the etiology of allergic manifestations

A case of *chronic spontaneous* hypoglycemia is recorded by G Laroche, Lelourdy and J A Bussiere (Presse méd, 36 295 (Mar 7) 1928) in a woman of 35 years, suffering for the past 4 years with paroxysmal nervous

disorders (mental confusion, epileptiform crises, coma, and at times diplopia) when she remains 4 to 5 hours without taking food. These crises cease upon the ingestion of sugar or the subcutaneous or intravenous injection of glucose. Following a stage of illness with coma lasting for 7 days, there occurred in October, 1927, a severe polyneuritis of the arms and legs with disturbance of walking, abolition of tendinous reflexes and reaction of partial degeneration of the nerves. Examination of the blood showed hypoglycemia of 0.75 Gm to 0.66 Gm per 1000. Owing to disturbances of the mechanism regulating glucose, this woman has a very unstable equilibrium and is extremely sensitive to a decrease (even of several grams) of the amount of glucose in her diet. Adrenalin, suprarenal extract and postpituitary cause the crises to disappear, but have no preventive action, at least no permanent one. Insulin, in a dosage of 15 units daily was at first tolerated for 7 days, then it seems to have occasioned the crises despite the ingestion of a greater quantity of glucosides.

The authors draw attention to the aggravating action of the proteins and lipoids which seem to use the rest of the glucose at the disposal of the organism and initiate the crises. These facts show that there exists in subjects presenting different disorders such as anguish, nervous crises, sudden hunger, a spontaneous hypoglycemia involving the necessity of repeated alimentation. In their case, the authors have not been able to determine the organ affected.

The disorder of the glycoregulative mechanism of their patient is complex. In fact, she assimilates and stores glucose and combines it, but she cannot liberate it readily. On the other hand, she cannot form glycogen at the expense of albumins and fats, and she must receive glucose to maintain her equilibrium. Perhaps she has no special lesion of a single organ, but disturbances of the glycoregulative function arising from various organs, in

particular, the liver, pancreas, glands with internal secretion, concurring normally in the equilibrium of the glycoregulative system.

*Hepatogenic* hypoglycemia has been demonstrated by W. H. Nadler and J. A. Wolfer (Arch Int Med 44:700 (Nov) 1929) in a case with primary liver cell carcinoma involving 70 to 80 per cent. of the total liver mass. The remaining liver cells showed degenerative changes, but the pancreas showed nothing abnormal.

*Spontaneous* hypoglycemia in children, as observed by H. Josephs (Am J Dis Child 38:746 (Oct) 1929) in 4 cases, is characterized by attacks of somnolence, ketosis, vomiting and convulsions. Two attacks were fatal, and at necropsy the liver was found to be the seat of extensive fatty change.

**BONES.**—W. Bauer, J. C. Aub and F. Albright (J Exper Med 49:145 (Jan) 1929) experimented to find whether the bone trabeculae act as a reserve supply of calcium. They found that the trabeculae were easily depleted by the prolonged administration of parathyroid extract, long continued negative calcium balance and growth. A long continued high calcium diet results in a rapid accumulation of the trabeculae. The bone trabeculae, therefore, serve as the storehouse of readily available calcium. It is suggested that the absence of trabeculae in premature infants and their depletion at the end of 4 months in a normal baby might well be an etiologic factor in *rickets*.

H. R. Bohlman (J Bone and Joint Surg 11:365 (Apr) 1929) tried to stimulate longitudinal bone growth in animals by the use of various foreign substances without success; instead,

he produced shortening at times This series of experiments does not warrant the clinical or surgical use of foreign substances in the region of the epiphyseal cartilage plate to promote growth in the length of the bones. Various types of wood seem to be quite innocuous to the bone cells and apparently interfere little with growth processes; it seems that they tend to stimulate bone shell formation about themselves

**CHRONIC ABSCESS (BRODIE'S ABSCESS)**—A O Wilensky (Am J Surg 5 455 (Nov) 1928) reports 5 cases and believes that the lesion is the end-result of one of the manifestations of acute osteomyelitis Of 5 cases in youths between 14 and 23 years of age, noted by C H Lenshoek (Nederl Tijdschr v Geneesk 1 2177 (May 5) 1928), in 3 there was a history of trauma, 1 infection in the extremity affected and 1 following typhoid fever P Siwon (Beitr z klin Chir 145 463 (Jan 16) 1929) reports 8 cases The patients are usually young adults, the tibia is the usual seat of the abscess, the metaphysis and diaphysis being almost equally affected The diagnosis is exceedingly difficult unless an x-ray examination is made Pain, localized near the joint and recurring effusions into the joint, should direct suspicion to such an abscess The treatment is always surgical

**BONE TRANSPLANTATION**—After a thorough study of the rôle and fate of a bone transplant, P G Kornew (Arch f klin Chir 154 499 (Feb 14) 1929) concludes that it acts as an architectural prop, that growth takes place only from the periosteum and that the marrow and endosteum take little part in bone growth.

H. E Mock (Surg, Gynec. and Obst 46 641 (May) 1928) concludes that in practically every case in which a bone transplant is indicated, the same repair can be obtained with less trauma by the use of an osteoperiosteal or pure periosteal graft

Two cases are reported by C. F Eikenbary (Northwest Med 27 284 (June) 1928) in which the fibula was used as a substitute for the tibia after the latter had been destroyed by osteomyelitis. The upper end of the fibula was transplanted into the remaining tibial head

**MULTIPLE OSTEOCARTILAGINOUS EXOSTOSES.**—There have been quite a number of cases of this interesting and deforming disease reported, with the conclusion that it is an inherited condition S A Pokrowsky (Arch f klin Chir 155 669 (Aug 9) 1929) found 18 members of one family involved, the transmission following the Mendelian law E Apert and C L Peytavin (Bull et mém Soc méd d hôp de Paris 53 346 (Mar 18) 1929) observed 2 cases in a brother and sister, whose mother probably had the same disease E Brenckmann and F Trentz (Rev d'orthop 16 333 (July) 1929) report a case in which thorough laboratory studies were made with no apparent deviation from normal B Frejka (*ibid*) 15 225 (May) 1928) gives his opinion that they are due to a dystrophy affecting the entire skeleton at the period of rapid growth He removed the growths that proved most troublesome

G R Burke (J Bone and Joint Surg 11 570 (July) 1929) reports a son and 2 daughters of a family in which the mother had died after removal of a tumor diagnosed as malign-

nant osteochondroma of the scapula. The father was unaffected by the disease. He calls attention to the observation of Ehrenfried that the most frequent and serious complication of this disease is the development of malignancy in one of the exostoses. J. V. Santos (*ibid* 11 260 (Apr) 1929) noted a case in which one of the exostoses in a multiple involvement affected the spinal cord by pressure. **Laminectomy and removal of the growths** was followed by relief of symptoms. [In 1 case that came under observation we found some shrinking to occur in certain of the growths following administration of **mixed gland therapy**. It was necessary to **remove** some of the **growths** that were most noticeable and deforming. This was an isolated case in an otherwise healthy family—Ed.]

Exostoses occurring on the os calcis, as the result of gonococcal infection, are said by H. K. Wade (J. Urol 20 259 (Aug) 1928) to occur much more frequently in the male than in the female and are usually bilateral. Trauma is a factor, and flat foot seems to be a predisposing cause, but in Speed's opinion, the majority of cases of true periostitis and painful spur formation of the os calcis are the result of gonococcal infection. The symptoms usually develop during the first year of the infection, with pain in the heel which is greatly exaggerated by walking and ceases entirely during rest. The gait is characteristic [as though they were walking on eggs—Ed.] Tenderness on the plantar surface of the heel at the tubercles, also may occur at the insertion of the tendo Achilles. X-rays show either a periostitis or actual spur formation. *Treatment* is at first palliative and rest

is essential. If the infection is still active in the genito-urinary tract, it should be vigorously treated. When a well developed spur is found, **surgical removal** is necessary. [We cannot agree with the statement that most painful spurs are gonorrheal in origin, neither are most of the painful heels, they may result from a focal infection, the teeth and tonsils being particular offenders. In our own experience of several hundred cases, gonorrhea has been found in but a small percentage of cases. As palliative treatment we have found **iodine ionization**, with soft rubber heel pads to be helpful. **Strapping of the arch** may show some results, but rigid arch plates should never be prescribed in this condition, which is only accentuated by them. **Internal lateral incision** with exposure of the growth and **removal** in one piece is the best surgical procedure. It is not a true spur, but a ledge that forms on the tubercle—Ed.]

H. Schutz (Beitr z klin Chir 145 65, 1928) believes the disease of the sesamoid bones underlying the first metatarsal head, described by Mueller as "typical disease of the sesamoid bones of the first metatarsal bone," is a form of juvenile necrotic osteopathy rather than a disease entity. Up to the present time it has been found only in divided sesamoids. It causes great inconvenience and is not benefited by conservative treatment. He advocates **surgical removal**. [This condition seems to occur at any time after 15 years of age, particularly in young females who dance a great deal, although it may also occur in young men who are on their feet considerably. There is pain beneath the head of the first metatarsal, usually

over the medial sesamoid, and some swelling, at times the condition will become acutely inflamed. Radiographs taken early show the sesamoid as an entire bone, with marked decalcification, sometimes appearing as only faint shadows, later radiographs show the bone separated transversely. It is our belief that the stress of function causes separation in the softened bone. Removal is the best treatment through an internal lateral incision. We have seen 3 cases recover with rest and padding. One case recovered and remained well for 2 years, recurrence necessitated removal. The condition is not uncommon, but is frequently missed unless its possibility is kept in mind —Ed.]

**FRAGILITAS OSSIUM** — The association of fragile bones and blue scleræ, is reported by G. Levander (*Acta chir Scandinav* 63 301 (Apr 11) 1928) in a patient who had sustained 18 fractures in 11 years. H. Paal (*Klin Wchnschr* 8 1304 (July 9) 1929) studied the problem of heredity in these cases, some of them being associated with otosclerosis. He claims that the supporting fibers of the sclera are poorly developed, causing it to become transparent to the blue pigmented uvea. The calcium metabolism is changed, causing deficient calcification of the bones on the one hand, and on the other, intense calcification of the labyrinth. The transmission proceeds probably according to the Mendelian law. Vallery-Radot, *et al* (*Paris med* (July 7) 1928) report a case showing bone fragility, blue scleræ and otosclerosis. E. Apert, E. Bach and Odinet (*Bull Soc de pédiat de Paris* 26 21 (Jan 17) 1928), observed a family consisting of the parents and 4

children, in which the father and 2 children have the blue scleræ and fragile bones. They believe that it is a law of heredity that affects half of the children of a person who has the disease and that it does not reappear in the unaffected descendants of such a person. E. Gorter (*Nederl Tijdschr v Geneesk* 1 2022 (Apr 27) 1929) states that antirachitic treatment has no effect on this disease, but that rapid recovery followed the administration of thymus gland.

**HODGKIN'S DISEASE** — A. H. Montgomery (*Ann Surg* 87 755 (May) 1928) states that this disease is usually regarded as an involvement of the lymphoid structure, the bone marrow is affected in 30 to 40 per cent of the cases. He reports a case of a boy of 9 years of age, in which the typical Dorothy Reed cells with an infiltration of eosinophilic leukocytes were found at autopsy in the cervical vertebræ and the right tibia.

**IRRITABLE ULCER OF THE MALLEOLUS** — C. E. Corlette (*Surg, Gynec and Obst* 48 811 (June) 1929) makes a subcutaneous section of the nerve and all of the tissues down to the bone, above and on either side of the painful area that includes the ulcer.

**KOEHLER'S DISEASE**. — F. Benso (*Riforma med* 44 179 (Feb 20) 1928) states that Koehler first described this condition in 1908 as a painful condition of the tarsal scaphoid, usually unilateral, and occurring between the fifth and ninth years, characterized by delay in the development of the bone. Boys are chiefly affected. There is no reported example of hereditary transmission. The symptoms are spontaneous pain in the dor-

sum of the foot aggravated by walking and pressure on the tarsal region, which is slightly swollen, red and hot. There is light limping, passive movements of the foot are not restricted. X-rays show the lesion to be localized in the scaphoid which is smaller than normal, especially in the antero-posterior diameter. The architecture is impossible to recognize, the cortex and spongy portion being run together, and density being increased 2 to 4 fold. The course of the disease varies, but, as a rule, recovery ensues in a few months. *Treatment* consists in immobilization of the foot by plaster or brace for 6 to 7 months. L. W. Ely (Arch Surg 16 560 (Feb) 1928) reports 6 cases, stating that the condition may be present without causing symptoms and may be found only on x-ray examination. He believes the condition is similar to the diseases described by Legg, Osgood and Schlatter, all 3 being due to an error in the development of the bone nucleus. Recovery is always complete, regardless of the treatment. [It is one of the conditions occurring in childhood that is frequently diagnosed as rheumatism, sprain or growing pains. Fortunately, it is a self-limited disease and, so far as is known, never suppurates.—Ed.]

**LENGTHENING OF SHORTENED FEMUR.**—H. W. Lamb (New England J. M. 200 179 (Jan 24) 1929) obtained  $1\frac{1}{4}$  inches in one case and  $1\frac{5}{8}$  inches in another, by means of simple **skeletal traction** with calipers (ice-tongs) or **Steinmann pin**. He first performed a "step" osteotomy of the femur. [This is practically a "Z"-shaped osteotomy, the bone being sectioned part way through at one point, then about 4 inches below,

it is sectioned the same distance through from the opposite side, the 2 partial transverse cuts are then connected by a long vertical section through the entire diameter. **Traction**, according to the above method, is then applied. After full lengthening has been obtained by traction, position is checked by radiograph and a long cast applied, or the traction left on until full union has occurred.—Ed.]

**OSTEITIS DEFORMANS (PAGET'S DISEASE).—ETIOLOGY—**

An interesting contribution to the etiology has been made by M. Bascourret and J. Decourt (Rev. neurol 1 606 (Apr) 1929) in which, after the study of 10 cases, they call attention to the irregular evolution, characterized by remissions and exacerbations. The chief symptoms of the exacerbations are pain, local hyperhidrosis, local hyperthermia and increase of the oscillometric index at the site of the lesion, these occur sometimes spontaneously, but are usually caused by fatigue and ameliorated by rest. They interpret the bone symptoms, as shown in the radiographs, as resembling those of tabetic arthropathies. The authors conclude from the symptoms (which they claim are due to the sympathetic nervous system) and the x-ray findings, that Paget's disease should be classed among the trophoneuroses.

**DIAGNOSIS**—That osteitis fibrosa cystica and Paget's disease may merge into one another is the conclusion of H. R. Sear (Med. J. Australia 2 516 (Oct 27) 1928), after the close study and observation of 200 cases.

C. G. Sutherland has made 2 excellent contributions to the radiographic diagnosis and the differentiation from



osteoplastic metastatic carcinoma. He calls attention to the general radiographic distinctions (Radiology 10:150 (Feb) 1928), and reports on the outstanding features relating to the pelvic bones (M Clin North America 11:1593 (May) 1928). In osteoclastic metastasis, radiotranslucent areas appear in the bones that resemble melted out areas in a piece of ice. Gas in the bowel may cause mistakes in the diagnosis and should be excluded before a definite opinion is given.

A subject that is of interest both to orthopedists and urologists, *i.e.*, periostitis and osteitis of the symphysis and ramus of the pubis following suprapubic cystotomies, is considered by E. Beer (J Urol 20:233 (Aug) 1928). This writer has observed a number of cases, characterized by pain at the attachment of the rectus abdominis when attempt is made to sit up or cough, followed by pain and tenderness along the attachment of the adductor muscles of the thigh, with consequent loss of abduction, tenderness on palpation along the body of the pubis. This condition may last several months. X-ray findings are given. Rest is advised [One can readily understand how these cases will be overlooked by diagnosis of tender scar, nerve caught in scar, etc., and, it is hoped not too frequently, "hysteria"—Ed.]

**PATHOLOGY**—After observing 2 cases of sarcoma of the humerus which developed in cases of Paget's disease and finding from bibliographic studies that this combination is frequent, G. C. Segale (Arch Ital di chir 22:482 (Nov) 1928) believes that the local condition predisposes to the development of malignancy.

### OSTEITIS FIBROSA CYSTICA.

—That the *parathyroid gland* is frequently, if not always, the offender in the causation of this disease is being more generally accepted as time passes. In support of this theory E. Gold (Mitt. a. d. Grenzgebiet d. Med. u. Chir. 41:63, 1928) tells us that the removal of a parathyroid tumor caused improvement in the disease and a return of the blood calcium to normal levels. R. M. Wilder (Endocrinology 13:231 (May-June) 1929) reports a similar case, while Cox (Brit Med Jour (Sept 15) 1928) relates an improvement in a case involving the lower extremities by the administration of calcium and parathyroid.

A. W. Adson (Surg Gynec Obst. 46:684 (May) 1928) calls attention to its occurrence in the spine and emphasizes the fact that the disease may involve other than long bones.

W. B. Coley and B. L. Coley (Am J Surg 6:602 (May) 1929) give a very extensive study of case of generalized osteitis fibrosa in a male aged 50 years.

**MULTIPLE CYSTIC TUBERCULOUS OSTEITIS** has been studied by Jungling (Beitr. z. klin. chir 143:401, 1928), who reviews 46 cases in the literature and 9 personal cases. It occurs in conjunction with lupus pernio and Boeck's sarcoid, involving the metacarpals and metatarsals, with occasional sites in the long bones. He differentiates it from spina ventosa and similar conditions, and calls attention to concurrent involvement of the tendon sheaths and bursae.

**OSTEOMYELITIS—ETIOLOGY**—C. L. Connor (J Infect. Dis 43:108 (Aug) 1928) reports a case in

which *Momilia* was isolated from a long standing case of involvement of the ilium

Suspecting that *M melitensis* may have been responsible for an osteomyelitis, Segre (Arch ital di chir (Apr) 1928) confirmed his suspicions by tests of osteoperiosteal localization in laboratory animals

Isolation of *vibrio septique* from a bone lesion, with accompanying staphylococcic organisms, led M Weinberg and J Davesne (Compt rend Soc de biol 99 35 (June 8) 1928) to conclude that the latter organism favors the development of the former

Analysis of 138 cases by F Beekman (Ann Surg 88 270 (Aug) 1928) all under 13 years of age and of the hematogenous type, showed on admission 98 acute, 40 chronic. There were 18 deaths in the acute type—14 from septicemia, 3 from pneumonia and 1 unknown. Schaffler (J Bone and Joint Surg 9 740 (Oct) 1927) in 85 *Staphylococcus aureus* lesions found 60 single lesions, 20 multiple, and 5 with syphilitic involvement [In view of the frequently expressed idea that syphilis or tuberculosis is present in most cases of chronic osteomyelitis, these figures are interesting and instructive — Ed] Huebeler (Wien med Wchnschr 77 1456, 1490, 1521, 1559 1927-28) collected 378 cases and found 142 males involved. The greatest number occurred at 13 years of age. The majority began in the warm season, incubation 12 to 48 hours. Primary joint involvement was observed in 20 per cent, 70 per cent were limited to 1 focus, 30 per cent showed skeletal metastases, and 7 per cent periostitis aluminosa

**TREATMENT** — **Resection** of the shafts of affected bones seems to find considerable favor among European operators, Martin (Soc de Chir, Paris méd (June 23) 1928) reporting 1 resection of 7 cm of the humeral shaft, and 2 of the tibial shaft. Cadenat (*ibid* (Apr 7) 1928) also reports a case of humeral resection, while Mouchet (*ibid* (Mar 3) 1928) describes 2 cases of solitary fibular involvement with resection. [This type of procedure has never found a great deal of favor in the United States and still must show its superiority to thorough **evacuation** of the diseased area by chisel and mallet or use of the high speed drill — Ed]

H W Orr (Surg Gynec Obst 45 446 (Oct) 1927) gives one of his usual concise and thorough explanations of the plan of treatment that bears his name, *vis*, after the bony cavity is prepared (all necrotic bone removed) it is well packed with gauze impregnated with vaseline that has been thoroughly sterilized. Generous sterile gauze dressings are applied over the vaseline pack and the diseased area, including the joint above and the joint below the diseased area, is enclosed in a plaster of Paris cast. This cast is permitted to remain for a period up to 10 weeks, the criterion for removal being the odor. When this becomes too severe the cast is removed with the vaseline pack, the part being thoroughly cleansed. It is then repacked with the vaseline gauze, dressed and another cast is applied. This procedure is repeated as often as necessary, until the wound has thoroughly healed. [Personal experience indicates that this has proved to be one of the greatest advantages in the treatment of osteo-

myelitis ever originated The results are striking and permanent—Ed ]

That holding the pus *in situ* about the wound, by the **Orr method** of treatment, increases the concentration of bacteriophage and accelerates both the phagocytosis and the dissociation of the organism, is the opinion of F H Albee (Internat J Med and Surg 42 1 (Jan) 1929)

In a lengthy discussion of the various foci of infection, with a consideration of the anatomy and blood supply of the bones Platt (Proc Roy Soc Med 21·1377, 1928) concludes that the establishment of early and effective **drainage**, with early wound **sterilization**, with all efforts to avoid further devascularization of infected and uninfected bone, is the ideal of treatment

Buzello (Zentrabl f Chir 55 820, 1928) advocates the early **chiseling open** of the bone, particularly in the old rachitic types, over 20 years of age **Incision** only, is reserved for the first 5 days of the disease After chiseling he packs with gauze and invaginates the skin

A modification of the older **irrigation method** is reported upon by M Saidman (Zentralbl f Chir 55 844 (April 7) 1928) who opens the marrow canal near either extremity of the long bone, or, if the canal is lengthy, opens in several places, removes all marrow by the curette, and then flushes the resulting canal with dilute **methylene blue**, or some other mild antiseptic, every few hours He uses this method in both the acute and subacute types

[We believe that early opening of the bone by **drills**, so as to allow utmost freedom of **drainage**, and the use of the **Orr method** represents al-

most the ideal in treatment of *acute types*, in the *chronic types* removal of all necrosed bone and the **Orr method** has given uniformly good results.—Ed ]

**OSTEOPOROSIS, PAINFUL POST-TRAUMATIC.**—A Florescu (Presse méd 36.1661 (Dec 29) 1928) reports a case in a female, aged 41, following a fracture of the inferior radial epiphysis The fracture was reduced and placed in a plaster cast For 1 month pain was present in the entire forearm, which was edematous but not painful to pressure There were neither trophic nor sensory disturbances, the nerve trunks were not painful on pressure The movements of the fingers and wrist were limited and painful X-ray showed osteoporosis of the right hand and the distal parts of the radius and ulna Wassermann reaction was negative. Treatment with salicylates was ineffective After **perihumeral sympathectomy** and application of a new **plaster cast**, the condition improved and radiographs showed recalcification in 1 month, in 2 months the patient was cured When this disease occurs as a localized condition in one or more of the carpal bones, J Buchman (Ann Surg 87 892 (June) 1928) suggests operative removal if conservative measures fail [In some slight experience with this condition, we have found **baking**, **massage** and **restricted use** of the extremity to produce results A case shown to us by another physician had been cured by the use of the ultra-violet lamp As the condition is believed to be due to deficient circulation or blood supply, care should be used in applying primary retention dressings If symptoms occur, early heat and massage

to the entire extremity is indicated —Ed]

**PERIOSTITIS.**—E Husted (Ugesk f Laeger 89 676 (July 28) 1927) states that pain and tenderness in the seat of attachment of the Achilles tendon to the heel is the determining factor in a diagnosis of periostitis of the heel. **Rest in bed** until complete disappearance of the tenderness, usually 8 to 10 days, is the basis of the treatment. [Cooling lotions, ichthyol, diathermy have a place in the treatment, as do measures taken to relieve strain on the tendon, such as a long adhesive strap applied from the foot to the calf of the leg posteriorly to hold the foot in slight equinus, a rubber sponge pad in the heel of the shoe —Ed]

W R Braizew (Zentralbl fur Chir 54 1550 (June 18) 1927) describes 3 cases of productive ossifying periostitis of the tuber calcanei in young persons with a history of arthritis. The disease attacks by preference the posterior process and may be complicated by inflammation of the Achilles bursa. To avoid recurrence, the spur, the bursa and the periosteum over the affected portion should be removed. [According to the location of the outgrowth, as determined by radiograph, either an internal or external lateral incision, vertically along the border of the tendo Achilles, should be made. It is rarely necessary to disturb the attachment of the tendon to any great degree. Incision should never be made directly over the tendon and it is unnecessary to raise or split it. It has been demonstrated that the bursa and the bony pathology can easily be reached and dealt with by the lateral method —Ed.]

**SYPHILIS** —Pick (Zentralbl f Chir 54 2309, 1927) differentiates the diffuse hyperosteoic form from fibrous osteodystrophy (Paget's disease). The condition occurs in both congenital (late) and acquired lues, attacking most frequently the tibia, radius and ulna. They are considerably thickened, partly sclerotic and partly porotic, having a soft uneven surface. The medullary cavity is filled to a greater or less degree by a spongy new growth. The periosteum is always involved, sometimes more than the bone. In fibrous osteodystrophy the marrow is changed into fibrous tissue, resorption of the bone occurs through the action of giant cells and new bone is formed as osteoid tissue, the periosteal changes occur in one stage, the marrow cavity is filled with fatty or red marrow.

**TUBERCULOSIS OF —ETIOLOGY**—The moot question as to the organism (human or bovine) responsible for bone and joint tuberculosis, seems to be approaching solution. A S Griffith (J Path and Bact 31 875 (Oct) 1928) finished the analysis of the fifth series of cases which have in their entirety totaled 598. He concludes that in children under 5 years of age, 33 per cent are bovine infections, between 5 and 10 years of age 24 per cent, while under 23 years of age there is 20 per cent. Over 23 years none were found. With bovine tuberculosis the bones of the vertebral column are more frequently involved than in any other part of the skeleton. [Spinal cases are always in the majority, so it is likely that the bovine infections would be greater in this area than any other —Ed]

L Cobbett (Brit. J. M. 1. 626 (Apr

14) 1928) agrees with the above in all particulars, even to percentages

The medico-legal importance of trauma in the causation of bone and joint tuberculosis is studied by B Benvenuti (Arch ital, di chir. 23 323 (Mar) 1929) in 16 case histories, he claims that it is rare, not exceeding over 1 or 2 per cent. The more common occurrence is an osteo-articular tuberculosis that is aggravated in its course by a trauma.

**PATHOLOGY**—In a study of the calcium and phosphate content of the blood serum in osteoarticular tuberculosis, G Popoviciu (Rev franç de pédiat 4 460 (Aug) 1928) found (1) that they were decreased as in rickets, (2) the ultra-violet rays increase the phosphorous content, (3) the conception of demineralization in tuberculosis and its cure by the administration of minerals thus becomes more rational.

*Bacilluria* was found by R I Harris (Brit J Surg 16 464 (Jan) 1929) in 37 per cent of 43 adults intermittently or constantly, 13.8 per cent of 67 children showed the same. In 49 cases of tuberculosis, other than osteoarticular, 4 cases or 8.8 per cent had bacilluria, all of them were either miliary or meningeal.

E Falk (Med Welt 2 749 (May 19) 1928) believes that constant normal sedimentation values which cannot be caused to deviate beyond physiological limits are a criterion of the clinical cure of osteoarticular tuberculosis.

The **DIFFERENTIAL DIAGNOSIS** is considered in its various phases by S Simon (Arch f Kinderh 82 157 (Sept) 1927). J O Wallace (Atlantic M J 31 927 (Sept) 1928) gives the clinical diagnosis and states that

the laboratory aids are: (1) microscopy, culture and animal inoculations of aspirated fluids, (2) skin tests, (3) biopsy (condemns it unless joints are broken down), (4) blood count, (5) Wassermann, (6) x-ray.

Several contributions relate to unusual sites and types of disease. M C Mensor (California and West. Med 29 336 (Nov) 1928) was only able to collect 3 cases of isolated disease of the carpal scaphoid, and adds another. L Torraca (Riforma med 44 515 (Apr 30) 1928) reports the second case in the literature of tuberculosis of the subtricipital serous bursa at the elbow. M Benci and A Mezzari (Chir d org di movimento 13 57 (Oct) 1928) found in a sanatorium experience 68 cases of tuberculosis of the finger. The lesion may be osteoperiosteal (most common in children) or central (most common in adults). Cure was obtained in 73.54 per cent. A very careful statistical analysis is given.

**COMPLICATIONS**—Various types of complications are discussed in the recent literature. S Simon (Deutsches Arch f klin. Med 163 81 (Feb) 1929) found 43 cases of kidney disease due to osteoarticular tuberculosis, he stresses the prognostic importance of the erythrocyte sedimentation test. H Ragolsky (New England J Med 201 11 (July 4) 1929) found 17.5 per cent of 200 cases of osteo-articular disease with *bona fide* pulmonary tuberculosis, while in 55 per cent intrathoracic disease was demonstrated.

**TREATMENT**—The treatment of these conditions has been enriched by some excellent contributions. That of A Rollier (J State Med 36 435 (Aug) 1928) is classical in its con-

sideration of the therapeutic, preventive and social values of **heliotherapy** in surgical tuberculosis G Gelli (Gior di clin med 9 156 (Mar 20) 1928) found that the blood serum of children after heliotherapy for osteo-articular tuberculosis showed reduction of the calcium and potassium content In normal children none of the mineral contents changed

That no extensively diseased joint can be reconstructed by **heliotherapy** is the belief of N Allison (New England J Med 198 332 (Apr 5) 1928), who thinks that early cases may be saved useful function E C Mekie (Brit M J 2 241 (Aug 11) 1928) thinks that artificial heliotherapy has not justified the early belief that it was specific, it is, however, a useful adjunct to treatment

It is evident from the sources of the contributions that **roentgenotherapy** is more popular in European countries than in America Here, this type of treatment has been used only to be discarded, the results not having justified some of the inherent dangers H Hueck and W Spiess (Strahlentherapie 32 322 (Apr 17) 1929) studied the growth disturbances in long bones following x-ray irradiation Fifteen of 76 patients showed no change, in 60 there was retardation, in 1 acceleration They admit however that in the majority of instances the disturbance was caused by (1) epiphyseal invasion, (2) necrosis, (3) circulatory inactivation There was a closer relation between the severity of the disease and retarded growth, than between the latter and intensity of irradiation W Schmidt (Beitr z klin chir 145 440 (Jan 16) 1929) found interference with longitudinal growth in 4 of 6 cases, this

was in the earlier days when larger doses were given. H Hueck (Arch f klin Chir 150 400 (May 15) 1928) found x-ray irradiation an important adjunct in the treatment Excellent results were obtained with *spina ventosa*, while in *lymph node disease* and *tuberculous peritonitis* 70 to 80 per cent. were cured It is invaluable after surgical removal of tuberculous lesions J Palugyay (Wien klin Wchnschr 41 1522 (Nov 1) 1928) warns against causing strong reactions, if the local condition is exacerbated and temperature rises, the dose should be lessened or given at longer intervals The maximum surface dose is 10 to 15 per cent of the skin erythema dose

In order to increase the calcium in a patient, C Clavelin and A Sicard (Presse méd 36 227 (Feb 22) 1928) inject 1 to 15 per cent solutions of calcium chloride intravenously, according to a definite schedule that they have arranged The patient is also exposed to ultra-violet ray The improvement in all various phases was satisfactory

That the limitation of fluids and a salt-free diet has not been successful in the treatment of osteoarticular tuberculosis is the opinion of F Bickenhauer (Zentralbl f Chir 55 2769 (Nov 3) 1928) who has discarded it G Karfiol (Deutsche med Wchnschr 55 739 (May 3) 1929) found that the results differed in cases using this dietetic régime, there seemed to be no influence on the local lesion, but there was some general improvement noted in some, in others there was no change either locally or generally The intermittent use of the régime gave better results than the continuous use.

The surgical treatment of bone and joint tuberculosis has not received as much attention in the literature as it has in previous years, which may or may not be an index to the trend toward conservatism that seems to be developing. An old saying, whose origin we do not know, "keep steel out of tuberculous joints," is apparently growing in popularity, as other and more conservative measures are adopted. This trend seems to be based on an increased knowledge of the general changes that either cause or accompany the disease.

A. L. Floresco (*Presse méd* 36 852 (July 7) 1928) after a study of 6 years' duration on the effect of **periarterial sympathectomy** on osteo-articular lesions, finds that its use is very much restricted and its field very limited. Two papers from the clinic of Nové-Josserand deal with the lower leg and foot, the first by G. Nové-Josserand and F. Pouzet (*Lyon Chir* 24 129 (Mar-Apr) 1927), being a study of 49 cases in children treated by atypical **tarsiectomies** in diffuse tuberculosis of the posterior tarsus in children. The operation is a rather wide one and the end-results seem to justify its use. The second paper by F. Pouzet (*Revue d'orthop* 14 377 (Sept) 1927), deals with 39 cases of tibio-tarsal tuberculosis treated by **open operation**. The article is quite long and is best understood by perusing it in its entirety, the method of procedure and various factors bringing about favorable results being fully described.

**TUMORS.—OSTEOBLASTOMA** occurring in laparotomy wounds of the epigastric area are treated by A. Keith (*Proc Roy Soc Med (Surg*

*Sect*) 21 1, 1927) who studied 3 cases in this area. He states that 34 of 36 cases occurred in the supra-umbilical part of the linea alba. He admits that a full and satisfactory explanation has not been reached.

Supporting the theory that the fibroblast in any part of the body may cause bone tumor or osteoblastoma, C. P. Rhoads and H. Blumgart (*Am J Path* 4 363 (July) 1928) report 2 cases of this type of tumor occurring in soft parts, not attached to bone, showing the histologic structure identical with osteogenetic sarcoma, but which failed to recur after removal.

**OSTEOMA** of the frontal sinus occurred in 2 cases observed by R. Harris (*Laryngoscope* 38 331 (May) 1928), who states that 117 cases have been reported in the literature.

In a female 74 years of age, with symptoms of claudication and later of pressure, and with a syndrome similar to that following physiological section of the cord, O. J. Raeder (*Arch Neurol and Psychiat* 21 1079 (May) 1929) found on autopsy an **OSTEOMA** of the spinal arachnoid.

A case of **BONE CYST** in the upper femur, in an infant, is reported by Lenormant (*Paris méd* (Feb 4) 1928). Fibrocystic disease of the femur having been found to contain streptococci in the bone, a vaccine was made, with resulting improvement. He believes that the condition is inflammatory and not neoplastic.

**SARCOMA** —*Etiology*—Considering the frequency of the expression of the opinion that a single traumatism can cause bone sarcoma, the view of Stephens (*Am J Surg* 5 364 (Oct) 1928) is interesting. He believes that irritation or moderate force either develops or activates the growth, but

that there is little evidence to show that a single trauma is responsible

It would seem that the endocrine disturbances that produce dwarfing are responsible for osteal sarcoma, to some degree H C McMillin (Pennsylvania M J 32 572 (May) 1929) describes 4 cases in 2 brothers and 2 sisters, all dwarfs

**Prognosis**—Primary sarcoma of the clavicle is, as a rule, rapidly fatal, the literature showing only 7 who lived 3 years or longer, according to Bell (Ann Surg (Nov) 1928), who adds another, living 3 years after removal of the growth

**Treatment**—Bérard (Lyon chir 24 451 (July-Aug) 1927 and L Tavernier (*ibid*, 24 52 (Jan-Feb) 1927), in commenting upon radiotherapy, roentgenography in diagnosis, and biopsy, advocate x-ray irradiation in extensive malignancy before biopsy [It would seem to be wise even in more limited cases to pursue this method, where malignancy is suspected—Ed]

In contrasting the results of surgery and radiotherapy, E Bressot and Fischer (Lyon chir 24 415 (July-Aug) 1927) report a case, 18 years old, with tibial sarcoma, who died 5 months after amputation, while a case with sarcoma of the humerus, aged 25, was living 20 months after treatment by x-rays

W A Evans and T Leucutia (Am J Roentgenol 20 303 (Oct) 1928) advise deep x-ray therapy in all form of sarcomas and giant cell tumors, operable or inoperable, whether or not combined with surgery, mixed toxins and lead therapy. "Five year" cures are looked upon as possible even when metastases have occurred

**BRONCHIECTASIS.—ETIOLOGY.**—L H Ermatinger (J. Infect Dis 43 391 (Nov) 1928) reports a study of 33 cases of chronic and acute lung abscesses and bronchiectasis disclosing the pyogenic organism *Staphylococcus aureus* in 75.4 per cent of the total cases, *Hemolytic streptococci* in 55.3 per cent and *Pneumococci* in 19.4 per cent

O von Lossow (Deutsche Ztschr f chir 212 71 (Oct) 1928) relates 3 cases occurring in twins aged 18 years and a brother (survivor of a pair of twins) aged 16 years. He believes these cases exemplify the rôle of heredity in the etiology. The grandfather of these children died of some lung disorder with copious expectoration

**DIAGNOSIS**—E Reist and A Soulas (Bull et mém Soc Med d hôp de Paris 43 1642, 1927) report a case of bronchiectasis in a male 23 years of age who developed bilateral bronchopneumonia following an abdominal operation and expectorated about one-half a liter (1 pint) of purulent, fetid material daily. The authors attribute the success of their examination to their technic which is as follows

After **cocainization** of the larynx and trachea, a simple transglottic and tracheobronchial **injection** of **stovain oil** (5 to 10 per cent) is given. The intratracheal injection is administered very slowly with a 15 cm syringe, first on the left side and then on the right side, 1 syringe being used for each. The patient is seated on a table and as soon as the injection is completed, he is placed in lateral decubitus for 3 or 4 minutes. The head and thorax are held by an assistant beyond the edge of the table so



that the hemithorax to be injected will not be compressed and there will be no interference with thoracic respiration. The injection, including the penetration time, takes from 6 to 8 minutes. After its completion, the patient is placed behind the screen so that the idea of a larger bronchial ramification may be obtained. A quarter of an hour after the injections, the lower portions may be seen and this is the best time to take the roentgenograms. Two roentgenograms are taken, 1 front view and 1 in the right or left anterior oblique position. The picture taken at an angle is generally the 1 most clearly showing the juxta-vertebral zones, especially the retro-cardiac space, in which bronchiectasis occurs frequently.

Regarding the disease in children, E S Thorpe, Jr (Pennsylvania M. J 32 168 (Dec) 1928) considers it a chronic lung condition probably due to bronchopneumonia, pertussis or measles leading to a constant state of sepsis. Renal disease is a noteworthy complication and undernutrition is an almost constant factor.

He also believes the rapid evacuation of pus filled cavities rather than cough mixtures and inhalations should be the proper method of attack. This should include postural drainage, bronchoscopic drainage, adequate nourishing food, cod-liver oil, fresh air and heliotherapy. Vaccines are of value when autogenous and should be given a thorough trial in long and advanced cases.

L. Eloesser (Northwest Med 28 245 (June) 1929) states that he has seen no cases in which the injection of lipiodol (40 per cent iodine in oil) was of value, but he believes it does no harm. Confirming the reports of

Archibald, Brown and Ballou, he definitely states that it is contraindicated in cases of pulmonary tuberculosis.

**TREATMENT.**—Eloesser (*ibid*) believes the treatment of cases of bronchiectasis varies with the symptoms. A most essential factor is the attention to the infections of the upper respiratory tract and the services of an experienced rhinologist should be obtained. Radical nasal operations are contraindicated because they retard a patient in his attempt to regain his strength and respiratory equilibrium. In many cases of juvenile bronchiectasis, a removal of nasal foci of infection has cleared the condition completely.

Medicine, rest, postural drainage and dry, warm climate at low levels helps to keep some of the patients fairly comfortable. Guaiacol carbonate, creosote and similar drugs markedly reduce the fetid odor of the sputum. Education to lean over the bed and empty the cavities has been of extreme value.

Codeine, morphine and similar sedatives are contraindicated in dyspneic, cyanotic patients. The author cites 2 cases of bilateral bronchiectasis who died overnight as the result of administration of codeine.

Artificial pneumothorax has been advised by many observers but of course this is useless in cases of pleural adhesions and in the absence of this condition it has not proven extremely successful. Thoracoplasty is advised by Hedblom, of Chicago. Eloesser (*ibid*) believes the selected cases will do just as well with pneumothorax, a much simpler procedure, and may even show better results. Phrenic nerve avulsion has been tried

in a number of instances but this is rather disappointing also. Some men have been so radical as to attempt 1 and 2 stage lobectomies.

**BRONCHITIS. — CHRONIC** bronchitis, or repeated attacks of acute bronchitis, is frequently due to bronchiectasis, or bronchial dilatation, according to Alton Ochsner (J A M A 93 188 (July 20) 1929). A large series of patients were examined, and in more than 90 per cent of those not giving a history at all suggestive of bronchial dilatation, a definite dilatation was found. The pathological changes found following bronchography were not in all cases similar to the bronchiectasis described in text-books, but may be only a bronchial dilatation. In 4 cases it appeared to be only functional, disappearing completely after treatment.

**ALLERGIC** bronchitis is described by G L Waldbott (J Lab and Clin Med 13 943 (July) 1928) as a type of bronchitis occurring in hypersensitive individuals which differs from the common infectious bronchitis. It is characterized by sudden onset, dry unproductive cough, and by response to ephedrine or epinephrin. It is elicited by substances known to cause asthmatic attacks, and sometimes occurs before the attacks. A bronchitis presenting the symptoms of a common cold may occur in an asthmatic, and is termed the "intercurrent bronchitis of the asthmatic."

Post-asthmatic bronchitis follows asthma of long duration and is often associated with permanent changes in the lungs due to allergic asthma.

**SYPHILITIC** bronchitis is stated by A Valerio to occur more frequently than generally thought. In

children, the involvement of the lungs, pleura or bronchi appear after 6 years, and in adults 15 or 20 days after the chancre develops.

The bronchopulmonary syndromes of secondary syphilis reveal the presence of a diffuse bronchitis. The syphiloma is characteristic of the tertiary lesions. The diagnosis of syphiloma may be made on the history and symptoms of syphilis, the localization of the lesion (which regularly is at the central part or base of the lung), and absence of tuberculosis. The tentative treatment with mercury is also of diagnostic value.

**TREATMENT** — In *chronic* bronchitis repeated introduction of iodized oil into the tracheobronchial tree gives marked improvement in the clinical symptoms and signs evidenced by the diminution of cough, a decrease or disappearance of sputum, increase in the appetite with a gain in weight, and a feeling of general well being, according to Alton Ochsner (*loc cit*).

The bacteriological examination of the sputum shows a decreased number of organisms. There is also a diminution in the amount of sputum with a lessening or absence of the fetid odor, and while it is impossible to re-establish a normal condition of the bronchial wall in old cases, they can be sterilized and rendered symptom-free.

The "passive" technic is considered the ideal procedure for introducing iodized oil into the tracheobronchial tree as it is simple and harmless.

One of the simplest applications of medical knowledge may be found in dietetic treatment of *chronic* bronchitis, or a tendency to recurrent bronchitis in patients with abdom-

inal obesity as noted by C Wall (Lancet 2 957 (Nov 10) 1928) The reduction of girth will in many ways assist in the descent of the ribs and constriction of the thoracic outlet so as to permit easy and beneficent expectoration Again, in active hemoptysis, the patient should be in a semi-sitting position, so that expectoration may be accomplished with the least effort In the treatment of all kinds of cough associated with expectoration, it is an advantage to allow the patient to sit so as to fix the pelvis and to bend the spine and neck forward so as to aid the depression of the ribs

**Sodium cacodylate** has been used by Veilchenblau (Munchen med Wchnschr 75 222 (Feb 3) 1928) intravenously in a small group of patients suffering from *chronic* bronchitis, with or without secondary asthma He observed his best results by employing a 50 per cent solution which he injected at intervals of 3 days in doses beginning with 1 c c (16 minims) and increased by this same amount up to 6 c c (1½ drams), at which point the daily dose is reduced by 1 c c (16 minims) until the initial dose is again reached He believes the mechanism of this procedure to depend mainly upon a partial sterilization of the lungs as a result of the excretion through them of decomposition products containing arsenic There is also some evidence of an improvement in the elasticity of the lung through the direct action of arsenic The treatment seems to be useless in spasmodic asthma, its effect being limited to that form which is immediately dependent upon the existence of chronic lung infection

**Ethylhydrocupreine** is recommended

as a *prophylactic* in severe bronchitis in which bronchopneumonia is feared, by Ehinger (Revue méd de la Suisse Rom 49 441 (July 25) 1929) When the drug is used in suitable dose, no harmful secondary effects are observed It is best given in fractional doses and making the limit of duration of the cure 3 days

**Ether** therapy for *post-operative* bronchitis has been used by A Abdanski (Zentralbl f Chir 56 1055 (Apr 27) 1929) in treating 5 cases according to Riess' method (injection of 0.5 c c—8 minims—of ether and 0.5 c c (8 minims) of olive oil) and 19 cases by the injection of the following emulsion, **guaiaicol** and **camphor**, 1 c c (16 minims) each, **pine oil**, 0.5 c c (8 minims), **menthol**, 0.1 c c (1½ minims), **sulphuric ether** and **sterile olive oil**, 10 c c (2½ drams) of each The injection is made into the rectus femoris muscle, 1 c c (16 minims) of the mixture plus 0.5 c c (8 minims) of a 1 per cent solution of **procaine** being injected In severe cases, the injection is made twice daily for the first 2 or 3 days In 19 cases, the procedure proved entirely successful In 2 cases of chronic post-operative bronchitis, no result was noted One patient developed urticaria, probably the result of an idiosyncrasy to ether One patient with infiltration of the pulmonary apices was made worse The author warns against using this method in cases of pulmonary tuberculosis

**Oxygen** is a valuable therapeutic aid When used continuously, it prolonged life 26 days as described by R E Nutting (Am J Dis Child 37 1051 (May) 1929) in a case of *capillary* bronchitis Many of the bronchioles were plugged by fibrous tis-

sue to the point of occlusion and death was due apparently to asphyxia.

The fusiform and spirillum of Vincent in bronchitis is stressed by P. Lafosse and J. Langle (Rev. méd. Franç. 8 571 (Oct.) 1927) as a frequent cause of bronchitis which responds readily to arsenical treatment.

### BRONCHOPNEUMONIA.—

**ETIOLOGY.**—Bronchopneumonia in children has been studied bacteriologically by W. G. Liston (Arch. Dis. Childhood 4 283 (Oct.) 1929), a pure culture of *Pfeiffer's bacillus* being obtained from various sources in 33 out of 40 cases. In 5 other cases, it was not possible to obtain a pure culture of *Pfeiffer's bacillus*, though these organisms were recognized to be present by microscopic examination. In 2 cases only, no evidence was obtained that *Pfeiffer's bacillus* played any part in the cause of the condition. These were cases of extensive supuration of the lungs. Liston is convinced that this organism opens a path to the invasion of the body by secondary organisms particularly streptococci, pneumococci and staphylococci, as well as other organisms. The latter organisms may be found in the blood, causing septicemia or pyemia, in the serous cavities giving rise to empyema, peritonitis, or pericarditis, and they are frequently the cause of abscess formation in the lungs.

An analysis of 140 fatal cases of bronchopneumonia in children is presented by C. McNeil, A. R. MacGregor and W. A. Alexander (Arch. Dis. Childhood 4 111 (June) 1929). The age incidence was in the first year, 70, in the second year, 48, from 2 to 12 years, 22 cases. Thus, 84 per cent

of the total occurred in the first 2 years. The morbid anatomy and microscopic appearance are given. Five cases were atypical or mixed, showing the characters of alveolar (lobar) pneumonia in one part, and of bronchopneumonia in other parts of the lungs. The essential pathologic process in bronchopneumonia, and its bearing on the clinical features and etiology, are briefly discussed.

**COMPLICATIONS.**—Schippers (Nederl. tijdsch. v. Geneesk. 2 4783 (Oct. 12) 1929) reports an unusual complication in bronchopneumonia in a 2 year old child whose pneumonia lasted 5 months. Three and a half months after the onset, the patient developed a symmetrical periosteitis affecting the second, third and fourth metacarpals, with painful swelling of the adjacent soft parts, and persistent pains in the neck muscles. After the pneumonia cleared up, the changes in the soft parts rapidly disappeared, though the periosteitis persisted a while longer.

**TREATMENT.**—M. W. Binge, E. S. Judd, A. B. Moore and R. M. Wilder (Arch. Surg. 17 1047 (Dec.) 1928) made observations in 205 cases of *post-operative* pneumonia, in most of which the diagnosis was confirmed by x-ray, and strongly indicate that the oxygen used in their treatment resulted in the saving of life. The oxygen was administered by means of the Barach-Roth tent. The results were best when the treatment was given early.

In experiments on guinea-pigs, pneumonia was produced by the intratracheal injection of relatively benign streptococci. Treatment with oxygen immediately after operation proved to be a useful measure, since it was

found to reduce the mortality 50 per cent.

In a group of surgical cases in which there was reason to fear the development of post-operative pulmonary complications, oxygen treatment was started immediately after the operation. The incidence of pulmonary infection in this group was practically *nil*.

**Vaccine** treatment in bronchopneumonia in adults was used by Kovatcheff (*Semana med* 2 30 (July 4) 1929) in an epidemic of measles among soldiers in which bronchopneumonia was a frequent complication. Four of the soldiers died. The vaccine was used effectively as a prophylactic in 62 cases. In another group of soldiers in which vaccine was not given, several complications developed. It was used in the treatment of 12 soldiers with measles who had developed bronchopneumonia. The vaccine therapy had a favorable effect and caused a rapid fall of the fever, improvement in the general condition of the patient, diminution in the respiratory symptoms (especially the dyspnea), and suppression of complications or of a recurrence of the disease. All the patients recovered. In both groups, the treatment was begun with the injection of 0.5 c.c. of the vaccine the first day and then 1 c.c. daily for 3 successive days. Untoward effects were not observed.

**Emetine hydrochloride** has been used in the treatment of children with bronchopneumonia by C. R. Wilson (*Brit M J* 1 844 (May 19) 1928) in a series of cases—50 definite cases and 50 controlled cases. Both series gave a death rate of 40 per cent and the percentage of definite cures in each case does not differ greatly

Thus, in these results emetine hydrochloride cannot be considered as a cure for bronchopneumonia. The high death rate in both cases may be condoned to some extent by the fact that the majority of the patients were drawn from the very poorest classes, were initially possessed of a poor degree of natural resistance, and in many instances were brought to the hospital too late for really effective treatment. The febrile period seems, on an average, to be reduced in the emetine series, and in both series the fall was by lysis. There were no toxic symptoms, nor was any undue depressant effect noted, nor did any objectionable local reaction occur following injection of the drug. While making no claim that emetine is a specific remedy, the author believes it to be of clinical value.

**X-rays** were applied by Bothner (*Munchen. med Wchnschr* 75 1248 (July 20) 1928) in 7 cases of bronchopneumonia in young children. In severe cases, however, the treatment failed and in the light cases it could not be shown that the improvement was due to the rays.

**BRONCHOPNEUMONIA IN INFANCY.**—Following a recent experience of 60 cases, A. Bocchini (*Pediatrics* 36 507 (May 15) 1928) reviews Nassau's classification of this condition into 6 types, *i.e.*, the simple pulmonary, cardio-vascular, atonic, alimentary, meningitico-eclamptic, and the septic. While not accepting this classification as indicating separate types, but rather as defining cases in which there is greater or less predominance of various symptoms, he has adopted, with good results, Nassau's therapeutical suggestions for each type. In the simple *pulmonary*

*type*, he trusts mainly to **fresh air** and sedatives such as **urethane**. In the *cardiovascular type*, he has found much benefit from the use of **glucose injection** coupled with **adrenaline**. In the *meningeal type*, **lumbar puncture** frequently repeated often does much good, while calming measures, such as **warm baths** and the administration of **chloral** or **sulphate of magnesia** are useful. In the grave *toxic type*, often fatal in 36 hours, no treatment seemed to be of much avail. Where a large extent of lung was involved, with much dyspnea a free use of **oxygen** was indicated. Poulitices were found to be of doubtful value.

**TREATMENT**—Francisco Zamarrigo (Noticias Medicas, July, 1928) reports 25 cases of acute bronchopneumonia in infancy which he treated and has reached the following conclusions: (1) Primary bronchial pneumonia gives a better prognosis than secondary pneumonia. (2) The serum treatment should be given early in large doses, being, in the author's opinion, the first treatment to employ. (3) In cases where the serum fails, great benefit can be obtained by the use of **electrargol** by the intravenous route. (4) **Fixation abscess** should be brought about in those cases in which the treatment just described does not succeed. (5) The use of various measures in no way excludes the necessity of using heart stimulants in all cases.

**BURSAE.**—E Hogler (Wien Arch f Inn Med 15 63 (Feb 3) 1928) comments upon the symptoma-

tology of diseases of the bursa mucosa of the shoulder. He advises the use of active **radium** vehicles and injections of **sterilized milk**.

That tuberculous serous bursæ are best treated by **extirpation** is the opinion of G Ciaprini (Políclinico (sez chir) 36 7 (Jan 15) 1929) in reporting a case involving the gluteo-trochanteric bursæ.

Painful feet have been a bugbear to many patients and their attendants, many causes have been assigned, but P W Roberts (J Bone and Joint Surg 11 338 (Apr) 1929) states that inflammation of the bursæ of the foot, is responsible for many of the stubborn cases. He describes the various bursæ, the symptomatology and the treatment.

Fifty cases of subdeltoid bursitis were treated by J Resnik (Physical Therap 47 322 (June) 1929) with intensive **physiotherapy**, checked by repeated x-ray. They all became symptom and shadow-free. [From our own experience we can agree with this treatment. It is several years since we have found operation necessary. **Heat**, either from the electric baker or the infra-red lamp, **diathermy** (direct, using the two electrodes placed in such a manner that the heat focalizes on the bursa, or indirect, using **auto-condensation** with the fingers over the affected part), **iodine ionization**, using the negative galvanic pole with **iodine**, **massage** and **passive motion**, have given excellent results. Some of these patients, however, recover from **rest** alone, regardless of any other treatment.—Ed.]

## C

**CANCER.—TREATMENT — TUBERCULIN**—R Pearl, A C Sutton and W. T Howard, Jr, report 7 cases of cancer, regarded as hopeless, which they treated with tuberculin, a bouillon filtrate from Human strain 37. The dosage and intervals were regulated according to the patient's sensitivity as determined by an intracutaneous test with old tuberculin.

Following each injection there appeared to be a definite reaction in the tumor. During the first 6 weeks the dosage was kept low. At the end of that period, definite improvement in the patient's condition was usually noted although up to that time little change was apparent. In increasing the dosage at the end of 6 weeks great caution is necessary as death may result from the too rapid production of toxic products by the changes produced in the tumor tissue or from a condition closely resembling allergic shock. In the author's opinion, the clinical and histopathological results which have been obtained so far are of a sufficiently promising character to warrant continuation of the investigation. The most effective method of using tuberculin in the treatment of cancer, the effect of tuberculin on early cancer, and the value of tuberculin treatment in combination with surgery, radium irradiation, and other forms of cancer therapy are still to be determined.

**LEAD THERAPY**—W B Bell (Brit M J 1 431 (Mar 9) 1929) advocates that in addition to the beneficial effect of lead when used alone in the treatment of cancer, an aggregate effect is secured when lead and x-rays, and lead and radium are applied

within a short time of one another. In selecting patients for treatment with lead, involvement of the liver and kidneys as well as severe myocardial insufficiency, and serious anemia contraindicate the application of lead. As long as the patient is in good condition, with a prospect of about 6 months of life, other things being equal, treatment may be contemplated. The individual dose should be relatively small with a tendency to increase the quantity of lead to a total amount of 0.5 to 0.8 Gm ( $7\frac{1}{2}$  to  $12\frac{1}{2}$  grains). Suspensions of metallic lead or a colloidal preparation of lead phosphate were used.

The material was injected intravenously, and in a few cases, intra-arterially. Intramuscular injections were employed rarely. Ionization with lead, of malignant ulcers also was practised. The failure to observe beneficial effects by some investigators is due to the fact that they considered only absolute cures or failures. Moreover, their patients often were so ill that treatment could not be completed, or the treatment was so conducted that their patient died as a result of it. Bell emphasizes that "arrest and alleviation of the disease must equally be taken into account." He claims "65 successes out of 303 cases treated—that is 21.5 per cent of successful results." The author also believes that if the cases are carefully selected and the treatment well carried out the method tested has vast possibilities.

H J Ullmann (Radiology 8 461 (June) 1927) changed the technic of preparing the colloidal lead after unsatisfactory experience with the prep-

arations made according to the method of Bell. The author concludes that colloidal lead should not be used if the patient is unable to stand a reduction of at least 60 per cent of his kidney function; if the hemoglobin is below 50 per cent or if the red blood cells are below 2,000,000 or if the tumor has invaded the lungs. Involvement of the liver is also a contraindication.

H. J. Ullmann (J. A. M. A. 89 1218 (Oct 8) 1927) also concludes that lead renders the neoplasms distinctly sensitive to irradiation.

Various reports of the efficiency of colloidal lead in the treatment of malignant disease are at hand, with modifications, including A. Brunner (Schweiz. med. Wchnschr. 59 253 (Mar 2) 1929) who uses colloidal lead and mercury preparations. Some amelioration was noted in 8 cases out of 23.

G. Loewy and J. Loiseleur (Bull. de l'Assoc. franç. p. l'étude du Cancer 17 549 (Nov.) 1928) use glycogen as a vehicle for the colloid lead oxide. They explain that it was tolerated but results were not promising in 21 cases.

J. L. Jona (M. J. Australia 2 587 (Nov. 10) 1928) combines colloid lead with a paste of red blood corpuscles. Four injections were usually given. Fourteen cases were treated. Some temporary improvement was noted.

R. W. Brookfield (J. Path. Bact. 31 277 (April) 1928), working in Blair-Bell's cancer research laboratory, finds that patients exhibit considerable variation in their reaction to colloidal lead. In the majority of cases there is a moderate degree of blood destruction, which is controlled by the amount and frequency of the

dose. Some patients may lose half their red cells after a single dose.

In S. Wyard's observations (Brit. M. J. 1 838 (May 19) 1928) there is no support for the statement that colloidal lead exerts a beneficial result on the progress of malignant growth. He feels that is a difficult and dangerous therapeutic method.

**NON-SPECIFIC SERA AND VACCINE**—In studying the action of non-specific serum on malignant tumors, H. Auler and H. Picard (Ztschr. f. Krebsforsch. 28 433 (Mar 20) 1929) used a mixed serum consisting of equal parts of scarlet fever, streptococcus, diphtheria and tetanus horse serums. Increasing doses from 30 to 120 cc were given intramuscularly. General reactions followed in all patients treated. Local reactions about the tumor were not uniform. In all patients a temporary arrest of growth of the tumor was noted and, frequently, cessation of pain. The authors believe that the most important result of the study was the demonstration that non-specific serum produces just as favorable reactions in patients with malignant tumors as does specific tumor serum.

F. Nakamura (Gann 22 26 (June) 1928) reports arrest of growth of rat sarcomas by the injection of an autogenous emulsion of portions of the tumor. He feels that an autogenous tumor emulsion is more effective than bacterogenous tumor material. He also concludes that the emulsion has an antigenic action and it produces a specific immunity, having a destructive influence on the tumors of the animals which bear them.

S. Citelli (Tumori 15 152 (April) 1929) employed vaccine therapy in 15



curable cases. He obtained 11 apparent cures and in 4 cases evident prolongation of life or notable amelioration. The author never observed with his treatment rapid and grave local and general exacerbation, as is frequently noted following treatment with x-rays and radium.

**X-RAYS** —*Indications*—In cases of brain tumor in which immediate danger does not exist, x-ray treatment, combined where advisable with **decompression trepanation**, may be given a trial. Many brain tumors thus treated have retrogressed well and remained symptom-free for years. The same is true of tumors of the pituitary. R. Werner (Strahlentherapie 30 1 (Sept 10) 1928) has seen metastatic carcinomas of the spine disappear under x-ray irradiation. Gliomas of the eyeball have in some cases responded well. The treatment must be carried out with great caution. Tumors of the nasopharynx often retrogress with surprising rapidity under irradiation. Tumors of the upper jaw, on the other hand, are for the most part refractory to the x-rays. Sarcoma of the tonsil responds to irradiation much better than does carcinoma. In malignant tumors of the lower pharynx concentric x-ray or radium irradiation, using a number of fields, is the method of choice. **Radium**, direct internal or combined internal and external irradiation, is the only thing that has given relatively good results in carcinoma of the buccal mucous membrane. Werner (*ibid*) recommends trying the effect of external **radium** treatment before operating on sarcoma of the sternum or ribs. In carcinoma of the esophagus, x-ray irradiation should be given with

small doses only and at long intervals. The immediate results of x-ray irradiation of mediastinal tumors is very good, the permanent results are uncertain. **Radium** is somewhat better in cases of malignant tumor of the thyroid in the uppermost part of the mediastinum. In carcinoma of the bronchi and lungs, x-ray treatment can bring improvement of long duration, but the doses must be small. Intensive irradiation may cause fatal hemorrhage. Metastatic tumors in the gall-bladder and the lungs react well to the x-rays—better than primary tumors. Werner (*ibid*) believes that in inoperable tumors of the gastro-intestinal tract amelioration may sometimes be obtained by small daily doses of x-rays. He has seen a recurrence of carcinoma of Vater's papilla disappear permanently after x-ray treatment. The only intestinal localization of carcinoma in which x-ray treatment has had any considerable success is the sigmoid flexure. In carcinoma of the rectum, preoperative x-ray irradiation improves conditions for operation. Malignant tumors of the prostate, particularly sarcomas, are susceptible to considerable improvement from x-ray treatment alone or (even better) combined with insertion of **radium** needles. X-ray treatment, carried out with great patience, has given some worth-while results in carcinoma of the bladder. Some good results have been achieved by irradiation of sarcoma and carcinoma of the ovary. In carcinoma of the portio, preoperative treatment is best given with **radium**, postoperative treatment with the x-rays. He believes that this triple treatment has a great future.

G E Pfahler (Illinois M J 55 177 (Mar) 1929) says that the saturation method is the best method of radiation therapy. He states that a cure should be obtained in practically all cancers of the skin, if treated while they are confined to the skin, in from 70 to 100 per cent of cancers of the breast, operated upon while they are still confined to the breast, and 46 per cent of those with involvement of the axillary lymph nodes, if operation is combined with radiation, in from 50 to 75 per cent of cancers of the mouth treated early and thoroughly by gamma radiation, and in from 48 to 80 per cent of cancers of the uterus, treated thoroughly and skilfully, by radiation in the earliest stages.

G E Pfahler and B P Widmann (J A M A 89 1492 (Oct 29) 1927), in combining intravenous injections of dextrose with radiation therapy, in 111 cases found that there was no improvement that had not been duplicated with the use of radiation alone. While the dextrose seemed to ameliorate symptoms of the radiation sickness in many instances, its effect was usually lost after a few trials. They conclude, however, that as the relief was distinctly noticeable and permanent in a few instances, intravenous injections of dextrose are justified in any case in which the patient's discomfort may interfere with continued radiation treatment.

**RESULTS OF X-RAY TREATMENT**—W Schmidt (Strahlentherapie 30 197 (Oct 5) 1928) reports on the results of high voltage treatment in the Gottingen University Clinic between 1919 and 1927. He concludes that for operable tumors it cannot compete successfully with

surgery. Skin carcinomas are an exception, in canceroid, when it is multiple or when the age or the cosmetic point of view must be considered, primary irradiation is indicated. But if superficial cancer of the skin proves refractory to the rays, a radical operation should be performed promptly. Postoperative irradiation has improved the results in breast cancer. It should also be given in all cases in which the operation was not radical and after radical operation for sarcoma of the trunk. X-ray treatment is worth trying in all inoperable tumors, except with extreme cachexia and in certain carcinomas of the gastro-intestinal tract. He has found it useless in esophageal carcinoma. Local recurrences are more easily influenced by irradiation than lymph nodes or bone metastases, but its analgesic effect on bone metastases is noteworthy.

**RADIUM**—According to H A Bruce (Canad M A J 20 469 (May) 1929), the best results from radium are obtained in epitheliomata of epidermal origin, *e g*, epitheliomata of the skin, mouth, tongue, nasal fossæ, pharynx, vagina and cervix uteri. In the glandular extensions in this group, considerable advance has been made by employment of both surgery and radium. While surgery offers the best hope of cure of cancer in the most accessible situations, from recent developments in application of radium it is clear that radium will have to be employed to a much greater extent by the surgeon.

Sir Charles Gordon-Watson (*ibid*) thinks that the whole future of successful radiation of cancer depends on our ability to administer an optimum dose in any individual case and

says that the main factors concerned are (1) to estimate the amount of tissue to be destroyed and to establish a unit of dosage and time per cubic centimeter, (2) to work out a resistance ratio to radium according to the type of cancer and the part involved, and (3) to find some test which will indicate individual reaction to radium. At the present time we are mainly guided by empiricism. He regards 10,000 mgm hours as roughly a maximum dose, and 300 hours as approximately a maximum time and 2 mgm per cc as a unit.

**RADIUM (RADON)**—M I Nemenow and F S Grossmann (Brit J Radiol 1 187 (June) 1928) conclude that there is no difference in the general reaction of the organs to treatment with radon or radium salts. In both instances it is caused by the effect of gamma rays. In the majority of cases, reaction is characterized by headache, weakness, nausea, loss of appetite and sleeplessness. Occasionally, when very large doses are applied, vomiting and elevation of temperature are present.

**RADIOACTIVE INJECTIONS**—In the treatment of inoperable cancer, F Tománek (Strahlentherapie 31 735 (Mar 2) 1929) injects 1 millicurie in 1 cc of physiologic solution semi-weekly for several weeks into the margin of the tumor. In all of 30 patients thus treated the pain disappeared and the growth of the cancer was stopped for months. The author also used radioactive injections in the treatment of 5 cases of x-ray ulcer, in all of the cases the pain, which had been the most uncontrollable symptom and so severe that the patients could not sleep even

with the aid of narcotics, disappeared, and in 3 of the cases the ulcer healed.

**SURGICAL DIATHERMY**—Surgical diathermy, according to Simons (Zeil fur Krebsfoe, (June) 1928), is especially useful in tumors of body cavities and in parenchymatous organs, also in tumors with a special tendency to metastasize and in disintegrated, secondarily infected cancers. This treatment and radiotherapy supplement each other in an ideal manner. In combination they are especially effective in melanomas, nevus carcinomas and certain forms of sarcoma. Irradiation should follow diathermic destruction of malignant tumors.

G E Pfahler (M J and Rec 128 261 (Sept 19) 1928) states that moles, warts, fissures, crusts and some ulcers, are best treated by **electro-coagulation**, always extending the destruction slightly beyond the lesion. He contends that x-rays should not be used in treating moles or birth marks, and in skin cancer radium, x-rays and electro-coagulation can be used singularly or in combination.

**INFLUENCE OF DRUGS**—P Delbet (Presse méd 36 1473 (Nov 21) 1928) thinks that **magnesium** acts as a regulating factor in the evolution of epithelium. After a series of experiments, he concludes that the halogen salts of magnesium have some prophylactic action in cancer.

P Barbarin (Bull et mém Soc de chir de Paris 21 96 (Feb) 1929) considers **magnesium** therapy an auxiliary in the treatment of cancer, because it slows the evolution of some cancers, especially cancer of the breast and of the digestive tract (with exception of the liver) checks the

hemorrhages and ameliorates the recurrent ulcerations

R. Minervini (*Riforma med.* 44 622 (May 21) 1928) found that **antimony salts** and especially **antimony and potassium tartrate** exert a beneficial effect, sometimes have a decidedly healing action, in some cases of malignant tumor. He discovered also that **emetine** has a beneficial effect in some cases, particularly in adenocarcinoma. He has frequently observed that cases that do not respond to one of the remedies respond to the other, and that **extract of ipecac root** acts more promptly than emetine. He combined the salts of antimony and potassium with extract of ipecac, and in a number of cases a complete arrest of all pathologic manifestations has been obtained after 2 or 3 months of treatment.

#### **CANCEROUS CACHEXIA —**

R. B. Wild (*Lancet* 2:1062 (Nov 24) 1928) states that the cachectic state in advanced cancer should be treated by **fresh air, tonics and alcohol**. Alcohol is a most valuable adjunct to treatment, it acts as a euphoric agent, relieves pain and is a food which does not require digestion. Its use helps the patient to bear his troubles and prolongs his life from 4 to 6 weeks. When opiates are required, Wild prefers **opium** to morphine.

J. Pal (*Wien klin Wchnschr* 42 321 (March 14) 1929) points out that cancerous cachexia may be either anemic or toxic. It is assumed that the deficiency in red blood corpuscles is due to a disturbance of the function of the bone marrow. Pal's experiments induced him to believe that the effectiveness of **liver therapy** is due to its influence on the bone marrow, and that also such sub-

stances may be found in other organs, notably the glands of internal secretion. He names particularly the **suprarenal gland**.

**CARDIOVASCULAR SYSTEM.**—During the years of 1928 and 1929 such numerous contributions have been made toward the diagnosis and treatment of cardiovascular diseases that it seems wise in this résumé to refer only to the most outstanding observations and those most valuable from the standpoint of the practicing physician. To those more interested in contributions along the lines of anatomy, physiology, bio-chemistry, bacteriology, serology, pathology, roentgenography and electrocardiography in relation to the circulation, we should suggest a review of the issues of the various special scientific journals, especially "Heart" edited by Sir Thomas Lewis, and "The American Heart Journal," with its excellent Department of Reviews and Abstracts, and also the article by Sprague of Boston, appearing in the *New England Journal of Medicine* in August, 1929. He has made an excellent review of the progress in the study of cardiovascular disease and much of which is to follow in this article has been culled through the references contained in this excellent review.

**CLASSIFICATION AND DIAGNOSIS OF HEART DISEASE**—During the past 2 years the influence of the American Heart Association has quite properly made itself more definitely felt throughout this country in the attempt to prevent and relieve heart disease. Those interested in cardiovascular problems should certainly join this association. The *Journal of the Association*, under the ex-

cellent direction of Dr Lewis Conner and Dr Hugh McCulloch, has definitely established itself as the leading clinical journal of the world dealing alone with cardiovascular problems. This Association, cooperating with the Heart Committee of the New York Tuberculosis and Health Association, has offered the profession the most recent and practical criteria for the classification and diagnosis of heart disease and, because of its great value to the practicing physician, especially from the standpoint of etiological and functional classification, it seems only right to quote in full its Nomenclature for Cardiac Diagnosis (Bainton, Levy, Munly and Pardee, published in 1929 by the American Heart Association)

"From a study of the following tables it will be seen that a complete diagnosis is intended to include not only a statement of the structural changes in the heart but also one concerning the cause of such changes, one indicating the type of disturbance of physiological function, and finally one defining the functional capacity of the heart

Such a comprehensive diagnosis obviously requires careful consideration of every aspect of each case and is, therefore, essential to sound prognosis and effective treatment

Each diagnosis, to be complete, should include 1 or more titles from each of the groups A, B, C and D. Groups E and F, of course, require only reference to the etiological factor

#### A ETIOLOGICAL

- 1 Unknown
- 2 Rheumatic fever <sup>1</sup>

<sup>1</sup> In the case of each of these conditions, it should be noted, if possible, whether the etiological factor is still active or is inactive

- a Polyarthrititis
- b Chorea
- c. Growing pains
- d Tonsillitis
- e Pharyngitis
- f Others, as purpura, erythema nodosum, etc
- 3 Syphilis <sup>1</sup>
- 4 Bacterial infection <sup>1</sup>  
(Specify bacterium if possible)  
Here should be classified subacute infective endocarditis (*Streptococcus viridans*), chronic endocarditis, etc
- 5 Thyroid <sup>1</sup>
  - a Hyperthyroidism
  - b Hypothyroidism
- 6 Toxic
  - a Bacterial toxin.
  - b Mineral
  - c Vegetable
 (Specify if possible)
- 7 Neurosis (cardiac)
- 8 General systemic disease  
(Specify the disease, e g, arteriosclerosis, chronic nephritis, diabetes, emphysema, hypertension, anemia, etc)
- 9 Trauma
- 10 Congenital development defect

#### B ANATOMICAL

- 1 Undiagnosed
- 2 Atrophy of heart
- 3 Enlargement of heart
- 4 Hypertrophy of heart
- 5 Dilatation of heart
- 6 Ventricular preponderance
  - a Right
  - b Left
- 7 Auricular hypertrophy
- 8 Cardiac thrombosis
- 9 Cardiac infarction
- 10 Rupture of heart
- 11 Myocarditis, acute
- 12 Myocarditis, chronic
- 12-a Fibrosis of myocardium
- 13 Fatty infiltration
- 14 Fatty degeneration
- 15 Endocarditis
  - a Acute
  - b Chronic
 (Include the continuous activity of a valvulitis, or papillary muscle, chorda tendineæ, or mural infection. Usually 15 would precede the 16 diagnosis)

- 16 Cardiac valvular disease  
(Should be thought of as active or inactive as expressed under etiology )
  - a Aortic insufficiency
  - b Aortic stenosis
  - c Mitral insufficiency
  - d Mitral stenosis
  - e Pulmonic insufficiency
  - f Pulmonic stenosis
  - g Tricuspid insufficiency
  - h Tricuspid stenosis
- 17 Congenital abnormality  
(Specify lesion if possible )
- 18 Pericarditis, acute
  - a Serous
  - b Serofibrinous
  - c Purulent
- 19 Hydropericardium
- 20 Hemopericardium
- 21 Pneumopericardium
- 22 Adherent pericardium
- 23 Aortitis  
(Aortitis due to syphilis, etc., in contradistinction to 28, which includes arteriosclerotic changes in the aorta )
  - a Without dilatation
  - b With dilatation
- 24 Tumor of  
(Specify part affected )
- 25 Aneurysm of  
(Specify affected vessel )
- 26 Embolism of  
(Specify affected vessel )
- 27 Thrombosis of  
(Specify affected vessel )
- 28 Arteriosclerosis of  
(Specify locality, as coronary arteries, cerebral arteries, etc )
- 29 Arteritis of (except aorta)  
(Specify locality )
- 30 Periarteritis of  
(Specify locality )
- 31 No circulatory disease
- 32 No cardiac disease

### C PHYSIOLOGICAL

- 1 Regular sinus rhythm
- 2 Ectopic rhythms (without tachycardia)  
(This is to be differentiated from ectopic rhythms with tachycardia of the paroxysmal type. In the ectopic rhythms without tachycardia, it is usually believed that the new rhythm has developed because of a depression of the normal pacemaker

*Example* Under this heading should be classified such a rhythm as nodal rhythm )

- 3 Vagal arrhythmia
  - a Sinus arrhythmia
  - b Sino-auricular standstill
  - c Simple bradycardia
  - d Ventricular escape
  - e Wandering pacemaker
- 4 Sinus tachycardia (not paroxysmal)
- 5 Premature contractions
  - a Auricular
  - b Junctional
  - c Ventricular
  - d Unknown
- 6 Paroxysmal tachycardia
  - a Auricular
  - b Junctional
  - c Ventricular
  - d Unknown
- 7 Auricular flutter
  - a Paroxysmal
  - b Chronic
- 8 Auricular fibrillation
  - a Paroxysmal
  - b Chronic
- 9 Ventricular fibrillation
- 10 Auriculoventricular heart-block
  - a Partial block
    - (1) Prolonged conduction time
    - (2) Occasional dropped beats (irregular)
    - (3) High grade block (2-1, 3-1, etc )
  - b Complete block
- 11 Intraventricular block
  - a Partial
  - b Bundle-branch, right or left
- 12 Pulsus alternans
- 13 Valvular incompetency
  - a Mitral incompetency
  - b Tricuspid incompetency
  - c Pulmonic incompetency
  - d Aortic incompetency
- 14 Hypertension
- 15 Congestive heart failure
- 16 Effort syndrome
- 17 Anginal syndrome

### D FUNCTIONAL CAPACITY

- 1 Patients with organic heart disease, able to carry on ordinary physical activity without discomfort
- 2 Patients with organic heart disease, unable to carry on ordinary physical activity without discomfort

*a* Activity slightly limited

*b* Activity greatly limited

- 3 Patients with organic heart disease and with symptoms or signs of heart failure when at rest, unable to carry on any physical activity without discomfort

### E POSSIBLE HEART DISEASE

Patients who show abnormal signs or symptoms referable to the heart but in whom the diagnosis of heart disease is uncertain

### F POTENTIAL HEART DISEASE

Patients without circulatory disease whom it is advisable to follow because of the presence or history of an etiological factor which might cause heart disease

### EXAMPLES

*Heart Disease* A Active syphilis, B Aortitis with dilatation, aneurysm of the ascending aorta, C Regular sinus rhythm, D Class 2a, or

*Heart Disease* A Inactive rheumatic fever (chorea), B Valvular disease, mitral insufficiency and mitral stenosis, C Auricular fibrillation, D Class 2b

It seems wisest, for the sake of clarity, to adhere to the above grouping in our review of the contributions to cardiovascular literature made during 1928 and 1929. We have chosen the following headings as those in which the most important progress has been made during the past 2 years

I Rheumatic fever and its cardiovascular manifestations

II Coronary disease, coronary occlusion and angina pectoris

III The treatment of cardiovascular disease with special reference to digitalis therapy

Mainly, thanks to the influence of Sir William Osler, we are more and more realizing the value of reviewing the lives of famous physicians of the past and studying their works carefully. The year 1928, as the 300th anniversary of the publication of

William Harvey's "*Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus*," should bring to mind the tremendous importance of this physician's contribution toward the progress of our knowledge of the circulation

### I RHEUMATIC FEVER AND ITS CARDIOVASCULAR MANIFESTATIONS.—

Most authors seem to agree that approximately 90 per cent of all cardiovascular disease before the third decade, has for its etiology, rheumatic fever. Reference, therefore, must be made here to this "infection" in addition to the excellent review of RHEUMATIC FEVER appearing elsewhere in this SUPPLEMENT. P D White and T D Jones (Am Heart J 3 302 (Feb) 1928) found in a group of 2421 cases of organic heart disease, including the patients with uncomplicated angina pectoris (77) and uncomplicated auricular fibrillation (30), that the etiological factors apparently present, both alone and uncomplicated, were as follows in the order of frequency: (a) Rheumatic, 956 cases or 39.5 per cent, (b) arteriosclerotic, 364 cases or 35.7 per cent, (c) hypertensive, 708 cases or 29.2 per cent (hypertensive or arteriosclerotic or both, 1165 cases or 48.1 per cent), (d) angina pectoris, 353 cases or 14.6 per cent, (e) syphilitic, 95 cases or 3.9 per cent, (f) coronary occlusion, 71 cases or 2.9 plus per cent, (g) hyperthyroid, 68 cases or 2.9 per cent, (h) subacute bacterial endocarditis, 45 cases or 1.9 per cent, (i) congenital, 37 cases or 1.5 per cent, (j) miscellaneous, 51 cases or 2.1 per cent, (k) unknown (including the 30 cases of uncomplicated auricular fibrillation) 82 cases or 3.4 per cent. Frequently 2 and sometimes 3 of these etiological factors appeared to be combined in the same case

It is well to remember that even a higher percentage of cases may have rheumatic fever as the etiological factor, as the relationship between this infection and arteriosclerosis is still in the debatable stage

H F. Swift, C L Derick and C H Hitchcock (J A M A 90 906 (Mar 24) 1928), in discussing bacterial allergy to non-hemolytic streptococci in its relation to rheumatic fever, suggest that "one of the causes of confusion resulting from the reports of the results of different observers has been the variety of streptococci which have been isolated from patients with rheumatic fever. Each worker is naturally inclined to attribute a specific etiologic rôle to the strain isolated by him. The hypothesis that in rheumatic fever there is a hypersensitive state, which is not strictly strain specific, but which embraces a wide range of streptococci, reconciles these divergent observations. It makes understandable the possibility that the micro-organisms described by the following workers, to mention only a few, may indeed have been the exciting agents of the active disease in the patients from whom they were recovered: the *Streptococcus cardioarthritidis* of Small, the inulin fermenting anhemolytic streptococcus of Birkhaug, the strains described by Clawson, the *Micrococcus rheumaticus* of Poynton and Paine, and the 3 types found by Rosenow. It also explains the possible etiologic rôle of the strains recovered by us in the past 15 years, despite their great cultural and immunologic variation.

The widespread effects of rheumatic fever are gradually being established and it is no longer to be considered a disease which damages the heart

alone. W C von Glahn and A M Pappenheimer (Am J Path 2 235 (May) 1926) have demonstrated pathological lesions simulating Aschoff bodies in the peripheral vessels.

"That the virus of rheumatic fever may produce specific lesions of the aorta has been clearly shown. It would not, therefore, be surprising to find that the smaller peripheral vessels should at times be the seat of rheumatic lesions. This in truth has proved to be the case.

"A peculiar type of vascular inflammation has been found in a series of cases of rheumatic carditis, and in our experience in no other disease, so that we believe it to be specific and characteristic. We wish in this paper to describe the distinctive features of these lesions and to present detailed evidence in favor of their rheumatic origin. The material studied consists of a series of 47 consecutive cases of rheumatic heart disease, and of these the lesions were found in 10.

"The vascular changes to be described have thus far been found in the following situations: Lungs, aortic valve, kidney, perirenal and periadrenal adipose tissue, appendices epiploicæ of the sigmoid and colon, ovary, testis, pancreas and in a small polyp of the cecum. In most of these regions, only isolated vessels have been affected. As regards the lungs, however, 2 cases have been studied in which practically every small branch of the pulmonary arteries has been involved, in the kidney also the lesions have been quite widespread. The subcutaneous fat, joints and skeletal muscles have not been included in our routine material, so that we cannot speak of the possible occurrence of similar lesions in these tissues.

"The alterations involve the entire thickness of the vessel wall and frequently, though not invariably, throughout its entire circumference.

"The endothelium is swollen and basophilic, but appears intact. It may be exfoliated into the lumen, this may in some instances take place after death while in other cases it is obviously lifted off by the accumulation of a coagulable exudate beneath it. In no case has this alteration of the endothelium led to thrombus formation.



"The wall of the vessel appears thick in comparison to the caliber of the lumen and this increase in thickness is particularly striking when only a portion of the circumference is affected. The thickening in the early phases of the lesions is due primarily to the infiltration of the vessel wall with fibrin. This appears in the form of coarse interlacing strands staining pink with eosin, yellow with Van Gieson and blue with the Weigert fibrin stain. The fibrin threads in small vessels may extend into the contiguous cellular tissue, so that the original boundaries of the vessels are obscured. In larger arteries the fibrinous exudate is often limited by the internal elastic lamella, in these cases, the threads are circumferentially disposed.

"Accompanying this deposition of fibrin, there occurs a necrosis of the cellular constituents of the vessel wall, as shown by the chromatin fragments scattered amongst the fibrin threads. In some vessels there is also extravasation of red blood cells, either immediately beneath the endothelium or in the meshes of the fibrin.

"External to the necrotic wall of the vessel is a cellular tissue having a very distinctive and peculiar appearance. It is composed of a loose fibrillar stroma, in part fibrinous, in which are many nuclei. One may distinguish lobed nuclei of polymorphonuclear neutrophils, many of them pyknotic and fragmented, especially those nearest the vessel wall, larger vesicular nuclei, staining less intensely than those of the polymorphonuclears and often distorted or compressed into bizarre elongate or club-shaped forms. They tend to be arranged radially. Still further out is a loose infiltration of lymphoid and plasma cells, occasional eosinophiles and young connective tissue cells. In this tissue are many dilated hyperemic capillaries, the largest often exceeding the diameter of the affected vessel. The zone of capillary distention frequently extends far beyond the area of cellular infiltration and is a constant and conspicuous feature of the early lesions.

"The behavior of the elastic fibers in the affected vessels can best be followed in serial sections. The earliest change noted in the internal elastic lamella is a swelling and partial alteration in the staining reaction, so that the fibers appear beaded and

discontinuous. As one follows the vessels into the region where there has occurred exudation of fibrin, the internal elastic lamella may become more difficult to distinguish and finally disappears altogether. Before this point is reached, one may observe that it has become greatly stretched and attenuated by the fibrin which has been deposited beneath the endothelium, and actual rupture often takes place, the ends becoming widely separated and everted. The gap between the ruptured ends is filled with a mass of fibrin.

"The external elastic coat is even more difficult to trace, since in the small vessels affected it is often incompletely developed or even wanting. A few delicate fibrils persist and are pushed outward by the accumulated exudate.

"The recognition of a well-formed wavy *elastica interna*, when the vessel is followed in series to a point where the injury is less severe, is evidence that the lesion may affect the small arterial branches.

"In other instances, it is impossible even in serial sections to find any traces of an elastic coat, the thinness of the wall, as compared with the diameter of the lumen, indicating that the affected vessel is either a capillary or a precapillary venule.

"Additional evidence that the lesion may affect capillaries was obtained in studying sections of an ovary. Here the vessel involved lay in the wall of a small cyst with the edema and cellular infiltration about it elevating the cyst wall into a rounded prominence which projected into the cavity. When this vessel was followed in serial section, it could be traced directly into a sinusoidal capillary composed only of an endothelial lining with its basement membrane. A similar observation was made in an affected capillary in the substance of the aortic valve.

"It has been impossible to demonstrate bacteria in these lesions, either in the Gram-Weigert or methylene blue stained preparations.

"In the larger arterioles of the lung the picture is slightly modified. The reactionary zone about the vessel is often inconspicuous or wanting, even when the infiltration of the media with polymorphonuclears is intense.

"The fibrinous exudate is gradually re-

placed by a permanent tissue. The fibrin filaments become swollen and fused into compact homogeneous masses which for a time retain the specific staining reaction. Isolated clumps of fibrin may be found even after the reparative process is well established.

"Branching and polygonal cells with deeply staining vesicular nuclei, usually single but occasionally multiple, appear amongst the fibrin threads. These we believe to be derived from the endothelium. Where there have been clefts or spaces left by the retraction of the fibrin, these cells tend to line them, and where extravasated red cells lie free in the meshes of the fibrin, the cells seem to encompass them and to establish new blood channels. There has never been observed any ingrowth of fibroblasts or newly formed capillaries from the adventitial tissue. This secondary vascularization of the intima is an amazing feature of the lesion. When fully developed, the original central lumen of the vessel which persists throughout, becomes surrounded by a spongy or vascular tissue composed of tensely congested, newly formed sinuses separated by a loose fibrous tissue. When followed in series, these newly formed channels are found to communicate in many situations with the original lumen on the one hand, and with collateral vessels on the other.

"The internal elastic lamella which has originally been displaced outward by the exuded fibrin, may persist and may even become fortified by the development of a few fibrils which penetrate into the loose tissue between the newly formed sinuses.

"While not frequently encountered, distended capillaries are occasionally seen lying between the internal and external elastic lamellæ. These also may be followed through gaps in the internal elastic lamella to communicate with capillaries inside that layer.

"The healed lesions thus resemble at first glance canalized thrombi. But it is clear when they are followed through their development that thrombosis does not occur at any stage. The resemblance is therefore only a superficial one. The fact that the circulation is at no time interrupted by thrombotic closure of the vessels explains the absence of infarcts in the lungs, even

when the presence of an associated chronic passive congestion would favor their occurrence. Yet the interpolation of the cavernous tissue within the vascular tubes must bring about a slowing of the stream and probably results in stasis and congestion in the neighboring vascular channels.

"The formation of new blood channels, as has been pointed out, seemingly depends upon an initial extravasation of red cells in the interstices between the fibrin strands. In some instances where this has not occurred, the development of new vessels fails to take place. In such a case, the exuded fibrin is gradually replaced by fibrillar connective tissue in which there eventually appear newly formed elastic fibrils. At this stage the picture simulates an obliterating endarteritis.

"The muscular coat in the larger arterioles is affected to a varying degree. In many instances, the muscle fibers virtually disappear, so that the internal elastic lamella when it had not undergone destruction comes to lie in close apposition to the elastica externa.

"The fate of the peculiar inflammatory tissue which often forms a broad zone about the affected vessel is less easy to follow. Even in the more acute stages, many of the cellular components show degenerative changes, their nuclei being distorted and fragmented. Beyond that, it has not been possible to trace the process in detail. Presumably, the wandering cells disappear. In our material there has not been observed, even in the healed lesion, great formation of scar tissue in the vicinity of the vessels."

The work of these writers and others raises the question as to whether rheumatic fever, so frequently found in the first 2 decades of life, may not play a part in the subsequent development of coronary disease, arteriosclerosis and even so-called "cardiorenal disease" of the fifth, sixth and seventh decades.

J. R. Paul (Medicine 7:383 (Dec) 1928) discusses the pleural and pulmonary lesions in rheumatic fever. He says "We have remarked upon

the fact that pleurisy, generally with effusion, is a relatively common lesion of rheumatic fever, particularly in association with cases of carditis, generally indicating a severe rheumatic infection. It is perhaps another example of the selective manner in which this disease manifests itself upon serous surfaces. As a rule, it is characterized by the accumulation of fibrinous exudate or of an effusion, which, together with the enlargement of the pericardial sac, often with frank pericarditis, is an injurious combination leading to widespread compression of the lungs. This situation, coupled with cardiac embarrassment, adds considerably to respiratory distress which is such a frequent symptom of this disease.

"The presence of histological lesions in the walls of the pulmonary arteries and perivascular spaces has been confirmed as a finding encountered in about 20 per cent of a group of active fatal cases. We have in this process a hitherto unrecognized lesion which may be widespread throughout the lungs."

Homer F. Swift (J. A. M. A. 92:2071 (June 22) 1929) suggests that the physician's attitude toward the patient with rheumatic fever, will alter if every case is regarded as potentially, if not actually, chronic, instead of acute, and those features regarded by so many as complications, considered as essential manifestations of the infection. The picture of "rheumatic fever" is not static, it moves, and only after recording day by day the separate impressions, then finally synthesizing them into a composite cinematograph, can one comprehend the diverse manifestations of this peculiar disease.

Swift reviews briefly the different types of the infection. The simplest is the monocyclic, in which there is a rising fever with toxemia and drenching sweats for from 6 to 10 days, accompanied by a migratory polyarthritis involving continually new joints for the same period, until practically all of the large articulations have been affected. The temperature begins to fall, at the end of the second week both fever and arthritis have disappeared. The heart may not show any abnormalities except quickening in proportion to the fever, or a faint transitory systolic blow at the apex. At the end of 3 weeks, convalescence is established and the patient can quickly return to his work without demonstrable visceral impairment. The author deems **salicylate therapy** most efficacious, and many cases are probably treated at home, often by self-medication with **acetylsalicylic acid**. But often there occurs a transient low grade fever and leukocytosis at the end of the third week, an indication that the patient has not established complete resistance with the first cycle. Some patients have a second cycle much like the first, after which there is an effective immunity and no further uncomfortable symptoms. This polycyclic picture is often obliterated or masked by antirheumatic drugs, but careful observation will often reveal a significant increase in the white blood count, a more rapid pulse rate, transitory precordial pain, gallop rhythm or moderate joint pains, giving evidence of renewed activity.

Therapy often gives a false sense of security, hence under therapeutic conditions the physician is obligated to search for these apparently unimportant symptoms, for they are warnings not to be neglected. Often these cycles of the ebb and flow of balance between infection and resistance recur time and again before complete recovery takes place. With each relapse there is more and more tendency for obvious evidence of cardiac involvement to appear, because careful electrocardiographic studies recently have shown that myocardial disturbances occur in this disease with greater frequency than in any other, and often are unaccompanied by other easily detectable signs of cardiac disorder. In other words, merely because a rheumatic fever patient has not developed a murmur,

it does not necessarily mean that the patient's heart has escaped permanent damage. Occasionally there is a patient with polyarthritis, chorea, carditis and subcutaneous nodules all occurring simultaneously.

Swift groups his descriptions about polyarthritis and pyrexia. It is increasingly evident that inflammation about the joints is not necessarily an accompaniment of the infection. Recent studies have emphasized the fact that visceral involvements are just as much part and parcel of the infection as is arthritis. Therefore, just as arthritis and fever may be present without obvious visceral disease, so may there be other manifestations of the infection without arthritis. Probably the most familiar example is chorea, which not infrequently occurs without any other of the so-called rheumatic series in children. Very frequently one or another of the symptoms or signs of rheumatic fever may appear as isolated evidence of activity, and it may be that not until the passage of many years has the child shown enough different manifestations to permit a satisfactory establishment of the nature of its malady.

It was long thought that there was no characteristic histologic expression of rheumatic fever. Recently it is increasingly evident that the Aschoff body is only an archetype of a general mode of reaction toward the causative agent. The periarticular redness and edema, and the fluid from joints contain materials that are just as important in constructing a picture of the tissue reaction as any that may be obtained from necropsy. Periarticular tissue removed at biopsy and tonsils and adenoids excised for therapeutic purposes have furnished addi-

tional material for comparison with that obtained post-mortem, so that it is now possible from the assembled observations of clinicians and pathologists to reconstruct a fairly complete histologic picture of the disease.

**TREATMENT**—At the risk of repetition it must be emphasized again that recently the Council of Pharmacy and Chemistry of the American Medical Association decided that the usefulness of sera and vaccines of certain streptococcus preparations for the treatment of rheumatic fever was insufficient to warrant their inclusion in "New and Non-official Remedies." The experimental status of these products has been studied and, although they are suitable for controlled investigation by qualified experimental workers, propaganda inviting their use by the profession at large at this time is not justifiable.

To summarize then, we must admit at the present time there seem to be only 2 forms of treatment for active rheumatic cardiovascular disease, namely

Rest, with salicylates in the *acute arthritic* (exudative) and *pancarditic* (proliferative) stage, followed by prolonged rest with nourishing food, fresh air and sunshine in the *subacute* or more or less *latent stage*. And possibly in the near future "Intravenous desensitization or immunization with suitable antigenic substances—building up the immunity so that the liability to renewed infection will be lessened, or, if new infection occurs, the reactivity of the tissue will approximate that of immunity without hypersensitiveness." Swift (*loc cit*).

**II. CORONARY DISEASE, CORONARY OCCLUSION AND ANGINA PECTORIS.**—G. A. Allan's

studies (Brit Med Jour 2 232 (Aug 11) 1928) include 1000 consecutive autopsied cases in relation to coronary disease. Quoting Sprague's abstract (New England J M 201 318, 1929), "58 patients died suddenly from coronary artery disease, or disease in which there was definite occlusion of a coronary artery or main branch. Of the 58, atheroma was present in 49, arteriosclerosis in 13, calcification in 20, and syphilis in 11. It is important to note that while this group is a little less than one-sixth of the total, about one-sixth of the cases of atheroma are found in it, one-half of the cases of calcification, three-fourths of the cases of syphilis, but only one-twelfth of the cases of arteriosclerosis. This supports the view that the atheroma, the commonest lesion, is also a serious one, while calcification or syphilis materially increases the gravity of the case in the direction of promoting occlusion of the vessel. Fibrosis was present in 48 of these cases, but there were 10 in which there is no note of any fibrosis in the heart muscle. From this study, in addition to the general information regarding the frequency of the lesions and their effects, 3 points emerged which are worthy of note: (1) Severe coronary artery narrowing may be present without obvious lesion in the myocardium, (2) old standing severe arterial lesions and actual occlusion with fibrosis may be present without a clinical history of their occurrence, (3) patients may die with symptoms suggesting coronary artery occlusion in whom no such lesion is found."

One of the most instructive reviews of our present knowledge concerning coronary disease is that of J Parkinson and D E Bedford (Lan-

cet 1:4 (Jan 7) 1928). They state that true typical anginal attacks are the result of acute infarction of the myocardium from coronary occlusion. Coronary thrombosis is a complication of arterial disease and has been regarded as a terminal event in angina pectoris and of pathological interest only, but now the diagnosis is easily made during life. In some cases, owing to its similarity to acute abdominal conditions, like perforated ulcer, operations have been performed. In others, early diagnosis and proper treatment make a difference between life and death. In 100 patients observed carefully, no other diagnosis than myocardial infarction was possible.

**PATHOLOGY.**—In the vast majority of cases the pathological basis of cardiac infarction is atheroma of the coronary arteries. Final occlusion is usually due to thrombosis at the site of constriction or ulceration of the vessel. In 70 per cent of recent infarcts due to atheroma, thrombosis was grossly visible, in 30 per cent no thrombosis was seen, but may have been demonstrable microscopically. Occasionally, cardiac infarction is due to closure of the mouths of the coronary arteries by syphilitic aortitis, with or without additional thrombosis (less than 10 per cent). Coronary embolism is the rarest cause of gross cardiac infarction, usually as a complication of infective endocarditis.

From careful autopsy studies on 83 cases of cardiac infarction or fatal coronary thrombosis, these observers made the following observations. Including 4 cases of multiple thrombosis, the left coronary or a branch was involved 37 times, and the right 18 times. The area infarcted may be no larger than a penny or may include almost the whole of one ventricle, depending upon the area of muscle supplied by the occluded artery, which varies considerably in different hearts. The frequency of multiple cardiac infarcts seen postmortem indicates that many individuals survive for considerable periods. Of the 83 cases, the

immediate cause of death was cardiac failure in 62, and in the other cases other causes (perforated gastric ulcer, strangulated hernia, operations, malignancy, etc) were responsible. The complications included rupture of the heart in 5 cases, aneurysmal bulging in 5 cases, hemopericardium without complete rupture in 1 case, and intracardiac thrombosis, embolism, and pericarditis to be mentioned later.

**CLINICAL SYNDROME** — About 90 per cent of the 100 cases of cardiac infarction studied were males. The maximum age-incidence was between 50 and 70, though it was fairly common after 40. The immediate results of coronary thrombosis are threefold: shock, anginal pain, and symptoms of heart failure. Later the special symptoms of cardiac infarction may arise. The clinical picture varies according to the predominance of any one of these 3 elements: (1) sudden death at onset, (2) prolonged anginal pain with shock, (3) dyspnea and failure without severe pain.

1 With sudden death at onset, the patient collapses and dies with dramatic suddenness during the ordinary course of life.

2 In the sudden onsets with prolonged anginal pain and shock, the diagnosis is often established during life. The attack proper may be preceded for a few days by twinges of sternal or brachial pain, occurring apart from exertion, and often attributed to rheumatism or indigestion. The prodromal pains herald the beginning of thrombosis, while the attack indicates complete occlusion of the artery. The onset is abrupt, with agonizing pain in the chest, shock or collapse. The pain is usually sternal, but may be epigastric, and tends to extend more widely over the chest than in ordinary angina. Radiation to one or both arms, to the back, and even to the neck and jaw is common. In contrast to the rigid immobility seen during angina pectoris, the subject of coronary thrombosis often is very restless. Occasionally actual syncope occurs. With the pain the easily recognized signs of shock and circulatory failure appear. The cardiac impulse is usually feeble or impalpable, and the sounds are distant or inaudible. There may be gallop rhythm, frequently extrasystoles, but murmurs are rare. Crepitations over the lung bases and liver enlargement are

early and characteristic signs of heart failure. The blood-pressure at first is low.

In this series of cases, the duration of severe pain varied from half an hour to many days, passing off gradually, often leaving a dull ache or soreness and tenderness. After recovery from the initial shock the temperature rose to 99° to 102° F (37.5° to 38.9° C) and persisted so for a week. Leukocytosis up to 20,000 was common, but not invariable. Pericardial friction was heard in some cases after a few days.

Those who succumb to the attack may die suddenly, often with a recurrence of severe pain, or become increasingly breathless and cyanosed, dying with gross congestive failure in a few days or weeks. Those who survive the acute attack may present the picture of more prolonged severe congestive heart failure with ultimate death or recovery. Some patients emerge from the prolonged pain without failure, though often with a liability to anginal pain on slight exertion. A more favorable prognosis seems justified in those cases with previous attacks of angina pectoris.

Convalescence is usually slow, with blood-pressure returning to normal, heart becoming stronger, its sounds louder, and a return of the patient's color. Shortly after the attack the heart may appear normal on physical examination and remain so, though the electrocardiogram is often typically abnormal from the first. In one group of cases, when the initial attack is over, there is no immediate return of similar symptoms, though milder degrees of pain or "reminders" are common during the succeeding weeks. In another group, the initial seizure is followed by repeated severe exacerbations. Such patients may be desperately ill for weeks. In still another group, especially those already subject to angina, the symptoms of cardiac infarction are of more gradual onset. The anginal attacks become more frequent and more easily induced, without exertion and during the night. The pain lasts longer and is more severe until a *status anginosus* supervenes.

3 When infarction supervenes in a case with pre-existing signs and symptoms of heart failure, the clinical picture may be less distinctive. Pain may be an incon-

spicuous symptom, sudden exacerbation of failure being the only evidence of cardiac infarction

Of the **COMPLICATIONS**, pericarditis occurred in 13 per cent of the 83 autopsy cases and, clinically, pericardial friction was heard in 7 of the 100 cases. In 3 cases, phlebitis with thrombosis of the leg veins occurred. Occasionally, coronary thrombosis appears to be related to infection (carbuncle or sepsis) elsewhere.

**PHYSICAL SIGNS**—In all cases of coronary thrombosis evidence of general arterial disease and aortic atheroma or syphilis must be sought. With coronary atheroma the peripheral arteries may seem normal, though signs of aortic atheroma, such as rough aortic systolic murmur with a loud second sound, are often heard. The x-rays are an invaluable aid in demonstrating aortic atheroma. Cardiac hypertrophy is not characteristic of coronary disease unless hypertension or valvular disease is also present. The fall of blood-pressure following myocardial infarction can mask an underlying high blood-pressure which should be suspected with a large heart.

Coronary thrombosis may initiate angina pectoris, complicate its course, or prove the fatal termination. The pathology of angina pectoris may be clarified by dividing cases of angina into 2 groups. (1) The group in which coronary occlusion is a gradual process from atheroma or syphilis and leads to scattered myocardial fibrosis, with a clinical history of anginal pain on exertion becoming more frequent and more easily induced with time, (2) the group in which

at the onset or during the course, acute infarction occurs, usually from coronary thrombosis, with a history of one or more of the outstanding attacks described.

**ELECTROCARDIOGRAM**—Usually, the electrocardiogram after cardiac infarction is characteristic and occasionally it provides the only objective sign of a cardiac lesion. Figure 1 shows a typical curve, of which the diagnostic feature is the absence of an iso-electric period between the RS and T waves, resulting in a plateau type of curve in which the R-T interval is either elevated or depressed. After a few weeks characteristic changes in the T waves are usually seen. There is a deep inversion of T in either lead I or lead III, together with a lesser degree of inversion or flattening of T in lead II. These inverted T waves are sharply pointed and often of large amplitude. Figures 2 and 3 show typical curves. An additional feature in many cases is the small size of the QRS waves. Left ventricular predominance is usually seen. Extrasystoles are common. (See p 169.)

**DIAGNOSIS**—Diagnosis must be made from (1) other cardiovascular lesions and (2) from acute abdominal conditions.

1 The distinction from ordinary angina pectoris is shown in the following table. Intrapericardial rupture of the aorta usually proves fatal. The persistence of high blood-pressure and the predominance of dyspnea over pain suggests paroxysmal dyspnea of cardiovascular disease. Coronary thrombosis also has been mistaken for a neurosis when the patient has been restless and the pain unusually prolonged.

	<i>Angina pectoris</i>	<i>Cardiac infarct</i>
Onset	During exertion	Often during rest or sleep
Site of pain	Sternum, often mid-sternum	Sternum, often lower third
Attitude	Immobile	Restive, even walk around
Duration	Minutes	Hours or days
Shock	Absent	Present
Dyspnea	Absent	Often present
Vomiting	Rare	Common
Pulse	Unchanged	Small, often rapid
Temperature	No fever	Fever follows
Blood-pressure	Normal or rise	Distant, sometimes gallop or pericardial rub
Heart sounds	Normal	
Congestive failure	Absent	Commonly follows
Electrocardiogram	Often abnormal	Usually diagnostic

2 The abdominal conditions to be differentiated are perforated gastric or duodenal ulcer, acute pancreatitis, or cholecystitis. A careful history of previous attacks pointing to the cardiovascular system and the electrocardiogram will usually settle this question.

**TREATMENT**—Morphine,  $\frac{1}{4}$  to  $\frac{1}{2}$  gr (0.016 to 0.03 grams), may be given subcutaneously as often as necessary for pain. Amyl nitrite and trinitrin are contraindicated. Complete and prolonged physical rest is essential. Digitalis is useful for the relief of cardiac pain with symptoms of failure, a dose of 10 to 20 minims (0.6 to 1.25 cc) is given 3 times daily, but toxic effects must be avoided. Paroxysms of flutter or fibrillation may be treated similarly, if not by *strophanthin* intravenously ( $\frac{1}{200}$  to  $\frac{1}{100}$  grain—0.0003 to 0.0006 Gm). Even in simple or in paroxysmal tachycardia in these circumstances digitalis may be tried. Convalescence must be prolonged as long as possible.

**PATHOGENESIS OF ANGINA PECTORIS**—C S Keefer and W H Resnik (Arch Int Med 41: 769 (June) 1928) attempt to prove by the following review that angina pectoris is a syndrome caused by anoxemia of the myocardium.

They state that in Heberden's masterly description are found the essential features of angina pectoris. The condition depicted, rightfully termed "angina pectoris," is characterized by (a) paroxysmal pain, usually pectoral, provoked by an increase of the demands on the heart and relieved by a diminishing of the work of the heart, and (b) the likelihood of termination by sudden death.

It is the authors' belief that angina pectoris is always due to *anoxemia of the myocardium*, that is, the attack occurs when the oxygen supply to the heart is inadequate to meet the oxygen demands of the heart. In the usual case of angina, the anoxemia is relative, being sufficient for the needs of the heart at rest and insufficient when the work of the heart is increased. In acute coronary occlusion, however, the anoxemia is absolute, since the oxygen supply is inadequate even when the heart is at rest.

The idea of anoxemia as the cause of angina is not new. All coronary theories are based on the contention that ischemia of the heart muscle is the cause. However, the idea of coronary spasm incorporated in practically every recent theory attributing angina to ischemia, must be regarded with skepticism. Anoxemia may be demonstrated in all genuine cases of angina pectoris, without resorting to a theory of such questionable validity.

The pathologic conditions associated with angina pectoris may be grouped as follows: (1) Coronary disease (a) Sclerosis of the coronary arteries, with or without complete obstruction, (b) Occlusion or encroachment of the mouths of the coronary arteries by either syphilitic aortitis or arteriosclerosis. (2) Aortic insufficiency. (3) Miscellaneous conditions.

*Coronary Disease* is by far the commonest lesion in cases of angina pectoris. The production of anoxemia of the heart by such a lesion is, of course, clear.

*Aortic Insufficiency*—Although ranking far behind coronary diseases in incidence, this lesion is found in the bulk of angina pectoris cases not associated with coronary disease. Often the 2 conditions occur together, particularly when both are caused by syphilitic aortitis. Although it is true that when angina pectoris develops in a patient with aortic insufficiency, the valvular lesion is usually of syphilitic origin, angina is also seen in instances of rheumatic aortic insufficiency. Various hypotheses have been advanced to explain the occurrence of angina in cases of aortic insufficiency, but these authors feel that modern experimental evidence has furnished a logical explanation. It is possible to show that most, practically all, patients with angina pectoris, have a diminished blood supply to the heart, since practically all patients with angina have either coronary disease or aortic insufficiency. In the one case the decreased flow is due to physiologic changes resulting from the valvular lesion. The end-result in both conditions is the same anoxemia of the myocardium.

There is a discrepancy, easily explained, in the relative frequency of angina pectoris in cases of aortic insufficiency caused by syphilis as compared with the occurrence of angina in cases of rheumatic aortic in-



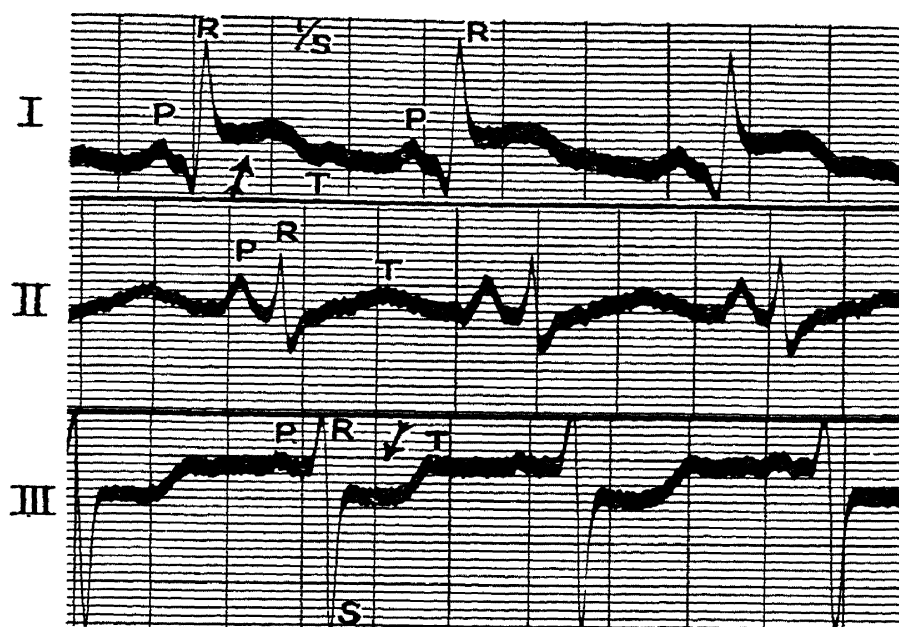


Fig 1—Electrocardiogram taken four days after coronary thrombosis, showing plateau type of curve, the R-T period is elevated in lead I and depressed in lead III, as indicated by arrows (Case 79) (Parkinson and Evans, in *Lancet*)

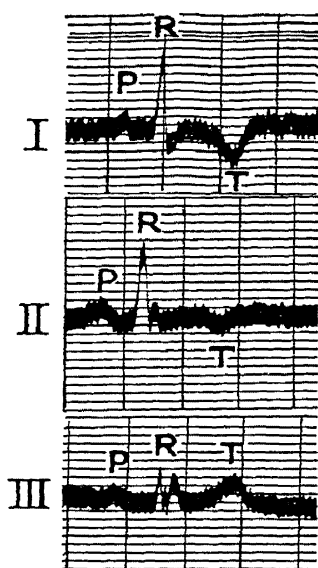


Fig 2—Electrocardiogram taken three weeks after coronary thrombosis, showing inversion of T wave in lead I and also in lead II (Case 66)

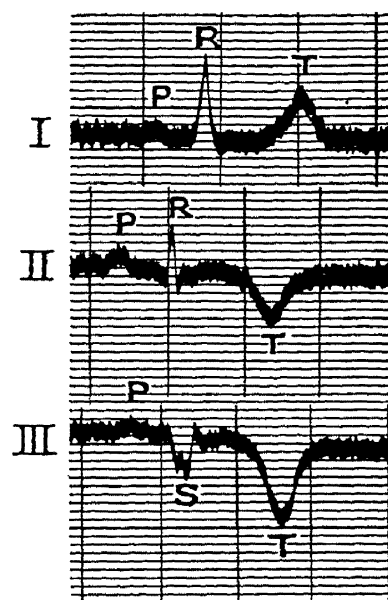


Fig 3—Electrocardiogram taken two and a half weeks after coronary thrombosis, showing inversion of T wave in lead III, and also in lead II (Case 82)

(Parkinson and Evans, in *Lancet*)

sufficiency In syphilitic aortic insufficiency the valvular lesion is "pure," uncomplicated by the presence of aortic stenosis In rheumatic aortic insufficiency, however, there is likely to be associated a more or less marked degree of stenosis, which tends to counterbalance the effects of the insufficiency Also, many of the patients with syphilitic aortic insufficiency have, in addition to this lesion, narrowing or complete occlusion of the orifices of one or both coronary arteries As either one of these lesions may lead to a certain amount of diminution of coronary flow, the combined effect of the 2 tends to cause a greater disturbance than is likely to occur in the average case of rheumatic aortic insufficiency

*Syphilitic Aortitis*—Its frequent association with angina pectoris has been evidence in favor of the aortic theory, particularly since aortic involvement seemed to account for the cases not explained by the coronary theory However, it is important to know whether syphilitic aortitis existed alone, or whether it was complicated by other lesions, namely, aortic insufficiency or occlusion of the coronary ostia The authors previously reported 26 cases of uncomplicated syphilitic aortitis, proved by necropsy, not one of which gave a history of angina pectoris There are enough cases reported to warrant the conclusion that uncomplicated syphilitic aortitis never causes angina pectoris unless either coronary disease or aortic insufficiency is also present

*Miscellaneous Conditions* (associated with angina)—Although coronary disease or aortic insufficiency or both are present in almost every instance of angina, there are exceptional cases associated with other conditions Angina has been reported in cases of myxedema, severe secondary anemia, in association with hyperthyroidism, but the condition of the coronary arteries is unknown in all these cases Attacks of pain sometimes occur in paroxysmal tachycardia, but evidence regarding the anatomic state of the coronary arteries, and the alterations in coronary flow is lacking Angina has also been found in cases of Addison's disease and polycythemia vera, but necropsy records are not available

There are certain cases, however, of considerable interest, from which to draw more definite conclusions Cases of angina, as-

sociated with anemia, have been observed in which the severity of the angina was proportional to the degree of the anemia, as the condition of the blood improved the angina tended to disappear Herrick has emphasized this condition At necropsy, sclerotic changes were found in the coronary arteries, and it is suggested that the anemia acted by diminishing the nutrition of the myocardium, already impaired by coronary disease Cases were reported of pernicious anemia with typical attacks of angina At necropsy, the coronary vessels and the aorta were normal These cases demonstrate beyond question the rôle of diminished oxygen supply to the heart in causing angina pectoris

Attacks of angina have been described in a few instances of arteriovenous fistula, the angina disappearing following its surgical closure

From the clinical description of several cases reported of pericarditis and angina, the authors feel the pericarditis was the result of the angina (coronary occlusion) and not the cause

Angina pectoris in persons with mitral stenosis is infrequent, although there have been rare cases

There are, at present, 3 outstanding theories of the pathogenesis of angina pectoris which merit particular attention (1) coronary theory, (2) aortic theory, (3) myocardial exhaustion theory

1 *Disease of the Coronary Arteries*—The view that coronary obstruction is responsible for angina pectoris has been abandoned in its strict sense There were 2 important obstacles (a) Cases of marked obstruction of the coronary arteries, in which angina pectoris had not been present during life, (b) cases of unquestionable angina pectoris in which autopsy showed the coronary arteries absolutely uninvolved

It is common observation that, particularly in involvement of the aorta, the mouth of a coronary artery may be completely occluded without any evidence of myocardial infarction Thus myocardial damage depends on (a) the rapidity with which the occlusion takes place—the slower the process the greater the opportunity for anastomosis to develop, (b) the richness of the preexistent anastomosis with the obstructed vessel Recently, Wearn has em-

phasized the importance of the Thebesian vessels in supplying the myocardium with adequate blood in spite of a coronary obstruction

Another important factor must be considered, *ie*, the sensitivity of the patient to *pain*. There is a condition in which association with pain is unquestioned—acute coronary obstruction with myocardial infarction. Yet, even in this, there may be a complete absence of pain, (*a*) either because the subject is relatively insensitive to pain, or (*b*) because the infarction occurs so slowly, only a few fibers being injured at a time, that the resulting sensation is insufficient to arise in consciousness. Libman believes fatigue is the main symptom in patients with coronary disease but with a diminished sensitivity to pain.

In view of the foregoing 2 considerations—(*a*) instances in which adequate blood supply to the occluded territory is assured by compensatory anastomosis between the coronary arteries and further by the Thebesian vessels so that infarction does not take place, and (*b*) instances in which pain is probably not felt even when infarction does ensue, either because of the patient's diminished sensitivity to pain, or because of the slowness of the process of infarction—it can no longer be held that coronary disease without angina pectoris is a valid argument against the theory that the coronary arteries are implicated in angina pectoris.

There remain cases of angina pectoris without organic coronary disease. These are a far more serious objection to the acceptance of an exclusive coronary theory. Some are unquestionably instances of genuine angina, but the accuracy of diagnosis in others is doubtful.

In spite of the objections that have been raised against the theory that organic disease of the coronary arteries is responsible for angina pectoris, the idea of coronary involvement has not been abandoned. However, it has yet to be proved that an effective coronary spasm can actually take place. If one assumes the possibility of vasoconstriction through stimulation of the vagi, but little support is given the coronary spasm theory in angina pectoris. Clinically, if vasoconstriction does take place, a slowing of the heart rate must be present. The

assumption falls to the ground, since there is no constant decrease, which is a necessary prerequisite for the acceptance of diminished coronary flow due to vagal stimulation.

In spite of extensive pathologic evidence, it is not possible to accept a theory which maintains that organic coronary disease is present in every case of angina pectoris. Nor is it possible to accept, without serious question, the hypothesis of vasoconstriction to explain those cases of angina without coronary obstruction.

*2 Disease of the Aorta*—The chief support of this theory rests on the finding of involvement of the aorta in practically all cases of angina pectoris, from the fact that practically all patients with angina have either arteriosclerosis or syphilitic aortitis. But (*a*) there are cases of angina pectoris without demonstrable disease of the aorta, and (*b*) extensive disease of the aorta may be present without the occurrence of angina.

The authors' most serious objection to the aortic theory is its inadequate explanation for sudden death. Starting with the assumption that the train of symptoms in angina pectoris, which frequently ends in sudden death, is inaugurated by stimulation of the nerve endings in the aorta, then sudden death can occur only as a result of reflex stimulation through the vagus or sympathetic nerves. They know no evidence that stimulation of the sympathetic nerves may cause sudden death. They have not found cases of sudden death in instances of syphilitic aortitis associated with hypertension and myocardial failure. Best evidence points to the sudden death being due to ventricular fibrillation. It is not known that vagal stimulation does not play an important part in the production of ventricular fibrillation. If ventricular fibrillation depends on the same mechanism as does auricular fibrillation—the development of a circus movement—it is practically essential that changes in the refractory period of the muscle occur. Lesions of the aorta, found in most cases of angina, are purely coincidental.

*3 Exhaustion of the Myocardium*—MacKenzie's hypothesis of myocardial exhaustion, designed to cover those cases in which there was not coronary disease, leaves unexplained the irregularity in the occurrence of angina

pectoris in various types of heart disease with exhausted heart muscle, the frequency of angina in cases with coronary disease or aortic insufficiency, and the rarity in cases with mitral stenosis. It does not explain why all patients who ultimately die of heart failure, exhaustion of the myocardium, do not sometime in their career, suffer from angina.

All 3 theories today are inadequate. It has been demonstrated, however, that practically all cases of "true" angina pectoris have lesions that may produce anoxemia of the myocardium, and it remains to show how anoxemia may bring about the manifestations that characterize angina pectoris.

*Cause of Pain*—The striking similarity between angina pectoris and intermittent claudication has long been noted. In both, pain is brought on by effort, cramp-like in character, and rapidly relieved by rest. In intermittent claudication, unquestionably, pain is due to diminished blood supply to the muscles. It has been demonstrated that whether or not there is any relationship between pain and fatigue under the circumstances of a muscle contraction when its oxygen supply is inadequate, pain is the earlier manifestation. Even more convincing evidence is afforded by the natural experiment of acute coronary obstruction, a condition characterized by one outstanding circumstance, the production of a sudden acute anoxemia of the myocardium. This condition bears the same relation to angina pectoris that an acute and complete obstruction of the femoral artery bears to intermittent claudication.

When one considers that a picture analogous to that of angina pectoris is produced in skeletal muscle by a diminished blood supply, and also that "*status anginosus*" is caused clinically by acute coronary obstruction, it seems strong evidence that anoxemia of the heart muscle can cause the pain of angina pectoris, a conclusion significant in view of the pathologic data demonstrating in practically every authentic case of angina a lesion that gives rise to anoxemia of the myocardium.

*Cause of Sudden Death*—About 60 to 75 per cent of the patients with angina die suddenly. The authors have not attempted to gather statistics, as they believe the conclusions are sufficiently well recognized

to be beyond serious dispute. They found that not only does angina pectoris terminate suddenly in a high percentage of cases that have lesions commonly associated with angina. Also that experimental evidence supports the view that sudden death is practically always due to ventricular fibrillation, and that this rhythm is particularly likely to develop under conditions that produce anoxemia of the myocardium.

If the views are accepted that anoxemia of the heart muscle produces the pain of angina pectoris, and that ventricular fibrillation, caused fundamentally by anoxemia, is the cause of sudden death, it becomes clear why sudden death is so common in angina and why this frequent outcome is so inseparably bound with true angina. The pain and the sudden death are both expressions of the same underlying cause. Once the ventricle has been rendered susceptible by anoxemia, this rhythm may appear at any time, usually after paroxysms of pain have occurred over varying periods, sometimes even before any pain has ever been caused. Its appearance is synonymous with practically instantaneous death.

An analysis of the apparent differences in the clinical features of "coronary disease" and angina pectoris reveals that they are entirely dependent on the differences in degree of anoxemia of the heart muscle in the 2 conditions. In angina, the anoxemia is relative and transient. It disappears when the cause of the anoxemia, increased work of the heart, disappears. In acute coronary occlusion, the anoxemia is absolute and permanent. The blood supply is shut off and effort is no longer necessary to bring on anoxemia. Acute coronary obstruction is prolonged angina pectoris. It is, in fact, exactly what used to be termed before the clinical picture of coronary occlusion was well understood, *status anginosus*. It is, however, something more than a severe, prolonged attack of angina, for the simple reason that the permanency and degree of the anoxemia introduce another factor, myocardial infarction, and the events that depend on this development.

*Angina Pectoris and Other Types of Pain*—The term "angina pectoris" should be applied only to the condition that corre-

sponds to the one described by Heberden, characterized by a more or less typical pain and by the likelihood of termination by sudden death, evidence of which is sufficiently strong to attribute its occurrence to the same underlying cause that brings on the pain, anoxemia of the heart muscle. This point is most important, and the term *angina pectoris* is used in entirely too loose a manner by most physicians. There are other types of cardiac pain which closely simulate "true" *angina pectoris*, but it must not be assumed that pain occurring in a certain region of the chest and radiating in a characteristic way is necessarily synonymous with the condition called *angina pectoris*. "There is only one *angina pectoris*, the *angina pectoris* due to anoxemia of the myocardium. All others are false."

*Considerations of Certain Problems Concerned with the Anoxemia Theory*—Infarction following coronary obstruction depends on the rapidity of the vascular occlusion and the richness of the preexistent anastomoses. In addition, a third important factor is the extent to which the Thebesian vessels may take up the burden of nourishing the myocardium. We have 2 extremes. In the one case, complete compensation for an obstruction of the coronary artery, so that the patient does not suffer any symptoms and the heart muscle does not undergo any change as a result of the vascular occlusion, in the other case, myocardial infarction takes place. Between these 2 extremes lie the various gradations of symptoms and pathologic damage that may be present in *angina*.

The paroxysms of pain in *angina* are provoked by increasing the demands on the heart and relieved by diminishing the work of the heart, and a case of *angina* is likely to terminate by sudden death. This rule applies to most cases, and it remains to discuss the exceptions, more apparent than real. Hence, the importance of rigidly enforcing absolute mental, physical and metabolic rest.

*Cases Characterized by Spontaneous Development of Pain*—Cases due to acute coronary obstruction can be dismissed. *Angina* is really caused by a disproportion between the demands on the heart and the oxygen supply to the heart. The oxygen

supply is suddenly reduced below the requirements of the heart of even the resting person. However, it has been demonstrated that sudden elevations of blood-pressure or sudden increases in heart rate may occur during sleep, particularly disturbed sleep, changes as marked as those that occur during moderate exercise. Moreover, the reduction of blood-pressure during such attacks is frequently followed by a rapid disappearance of pain. Again, certain patients who suffer from paroxysmal dyspnea frequently have nocturnal attacks of *angina*, preceded by a gradual increase in heart rate, blood-pressure and circulatory minute volume. *Angina* occurs, however, only in those who are already predisposed by other lesions that reduce the oxygen supply to the heart, such as coronary disease or aortic insufficiency.

*Cases Characterized by Attacks Not Rapidly Relieved by Rest*—The anoxemia of the *anginal* attacks in coronary occlusion is permanent and constant, and hence unaffected by rest. Most likely, cases occur in persons subject to paroxysmal dyspnea, and the long duration of the *angina* attacks may be due to the continued increase in circulatory minute volume that occurs before and during the attacks of paroxysmal dyspnea, whatever the fundamental cause of the increased circulatory minute volume.

*Cases Not Ending by Sudden Death*—In individuals who have long suffered from undoubted attacks of *angina pectoris*, the *angina* tends to disappear when heart failure supervenes, undoubtedly due to the fact that when myocardial failure develops in these patients, their activities are so restricted, on account of dyspnea and other disabilities, that they are unable to exert themselves sufficiently to bring on pain. Finally, there are cases characterized by long remissions, in some of which cures are practically obtained. It seems probable that the freedom from pain is due to the development of anastomotic channels, with temporary and possibly permanent relief of the anoxemia of the affected heart muscle. Therefore, the exceptions to the rule that *angina* is provoked by effort, rapidly relieved by rest, and likely to end in sudden death, are more apparent than real. Certainly in most cases an adequate explanation for the exception can be found.

Perhaps the best review of the entire subject of *coronary thrombosis* which has appeared in the world's literature is by S A Levine (Medicine 8 245 (July) 1929)

The first important and satisfactory account of the clinical features attending attacks of coronary thrombosis was published by Obratzow and Straschesko in 1910. These Russian authors diagnosed correctly 2 of the 3 cases they published. They emphasized a triad of symptoms: Severe, lasting, retrosternal pain, dyspnea and orthopnea, and, finally, gastralgia. All 3 of their cases had precedent angina pectoris. They called attention to many of the features we now recognize as important findings in coronary thrombosis, *e g*, gallop rhythm, Cheyne-Stokes breathing, pericardial friction, distant heart sounds, mural thrombi, pale cyanosis, etc. They also noted the different clinical and pathological events that might result depending upon the size of the coronary artery involved. They indicated that softening and rupture of the infarcted area might result with hemopericardium. They ascribed the fever that was present in their second case to pericarditis and pleuritis.

During the past 15 years physicians in America have added much to our knowledge concerning this condition. While an extensive literature was appearing in America, it is surprising that it was not until 1925 that this subject of coronary thrombosis as a specific problem began to be considered in England. Allbutt, however, many years before had called attention to the pathological condition, not from the point of view of clinical recognition, but rather in so far as it affected his theory of the aortic origin of angina pectoris. Mackenzie never made the clinical distinction between angina pectoris and coronary thrombosis, although he contested Allbutt's aortic theory and maintained the importance of the blood supply of the heart in the mechanism of the attacks. Only in the past 2 or 3 years have British authors become aware of this problem.

A most important and helpful advance in the clinical recognition of coronary thrombosis came about in this country when certain electrocardiographic changes were

found to be fairly characteristic of this condition. This work was the development of some experimental observations in dogs done by Smith, while he was associated with Herrick, who at this time was making some similar clinical observations. Smith noted sharp inversion of the T wave of the electrocardiogram in dogs shortly after the coronary arteries were ligated. At about this time Herrick published an account of the first case of coronary thrombosis which was proved by post-mortem examination, with electrocardiograms showing sharp inversion of the T waves in leads 1 and 2, which were not unlike those obtained by Smith in his ligation experiments.

The discovery by Pardee, that during the early days following an attack of coronary thrombosis there are fairly characteristic changes in the electrocardiograms, has proved to be a most valuable addition to our methods of diagnosis.

It is generally true that coronary thrombosis is the end result of previous angina pectoris. In many of the cases where the attack of coronary thrombosis seemed to have been the first indication of any existing heart disease, it has been found by close questioning that for some months or years there was definite constriction in the chest on hurrying, or some other significant complaints. Some cases were too sick to permit obtaining an accurate history, but, on the whole, it is safe to say that the great majority of patients had definite angina pectoris antedating the attack. There were, however, a much smaller number in whom no such history could be obtained even after the most careful inquiry. In fact, some would have been considered to be in perfectly normal health in every way until this most serious spell occurred. In these, after recovery has occurred, angina may be present, *i e*, an attack of coronary thrombosis may initiate a typical course of angina pectoris.

The relationship between *diabetes and coronary disease* needs particular emphasis. Since the great improvement in the treatment of diabetes that followed the discovery of insulin, new problems in the care of diabetics have arisen. The incidence of fatal diabetic coma has diminished strikingly, surgical complications are more readily cared for, and possibly because dia-

betics are now able to live longer than previously, the problem of vascular disease in diabetes, which can only develop over a span of years, has proportionately grown tremendously. Fitz and Murphy very recently called attention to the great frequency with which diabetics died of vascular disease. This is particularly true of diabetic patients over 35 or 40 years old, at an age when the diabetes is not particularly severe. In the care of such patients the problem of angina pectoris often becomes of much greater importance than that of diabetes, and proper treatment must be essentially directed with this point of view in mind. The fact that the presence of diabetes did not alter the prognosis of the attacks of coronary thrombosis nor the age at which they occurred, leads one to feel that it had no causative influence in the disease of the coronary arteries, but merely indicated the type of person who had a vulnerable vascular system.

Inasmuch as coronary thrombosis is essentially a disease of the arteries, it is a matter of some moment as to what evidence there is of sclerosis in other parts of the arterial system. No accurate estimate of radial or brachial sclerosis was made in this study because of the difficulty of interpreting variations from the normal. Although disease of the coronary arteries is often only a part of generalized arteriosclerosis, there are large numbers of individuals in whom very little evidence of arterial disease can be found anywhere in the body, except for this one important focus.

Syphilis is rarely an underlying factor in the causation of coronary thrombosis.

Rheumatic infections, which are the most common specific cause of serious heart disease, are of no importance in the condition here considered.

It is apparent that those conditions which predispose the individual to early arterial disease might be of some importance in the etiology of coronary thrombosis. It is, therefore, surprising that a history of gout was found in only 1 case. It is likely that if that factor had been investigated more critically, other instances would have been found. In a series of 103 patients with angina pectoris, 5 were known to have had gout.

It follows from the foregoing discussion

that specific diseases, except diabetes and hypertension, play an unimportant rôle as a causative factor in the development of coronary thrombosis. Heredity, on the other hand, is of considerable importance in the etiology of this disease. A large number of the patients here discussed have family histories indicating great susceptibility of the vascular system to degenerative disease. With this, or more likely as a part of the inherited traits, there is frequently a characteristic type of constitution that patients with coronary disease manifest. The typical patient is a well-set person, somewhat overweight, often of considerable physical strength, who has enjoyed unusual good health. Such patients often have indulged in vigorous physical effort either in the form of sports or in their ordinary work, and when they have not they are apt to feel that they have more than the average physical strength, even if they are not accustomed to use it.

We have been impressed by the fact that athletes seem to succumb to vascular disease at surprisingly early years of adult life. These are general reflections, despite the abundant evidence recently obtained which shows that there are no immediate harmful effects on the heart from violent effort.

The body weight of patients is of some importance in considering etiologic factors. It has been quite striking to us that coronary thrombosis does not commonly occur in thin individuals.

Another factor that may be mentioned, is the possible role of tobacco. There is considerable difference of opinion as to whether tobacco has any deleterious effect on the heart and particularly whether it is responsible in any way for the development of coronary disease. At present no satisfactory answer to this question is available.

The events that occur when a patient is stricken with an attack of coronary thrombosis have only recently been emphasized. The clinical picture was not described in current text-books of medicine until the last few years. It is, therefore, appropriate at this point to rehearse the symptoms and findings of a typical attack before taking up those features that are less constant but none the less important. The patient generally has had a previous history of angina

pectoris This may have manifested itself in its characteristic form and have led him to seek medical advice. Frequently, however, the complaints were regarded lightly by the patient so that no attention at all was paid to them or they were misinterpreted by the physician because of lack of knowledge of this disease. In many instances where coronary thrombosis existed and was supposed to have occurred as the first indication of any disease of the coronary arteries, we were able to uncover, by appropriate questioning, a definite history of angina pectoris that antedated the attack of thrombosis by months or years. Rarely, however, it was impossible to elicit any evidence whatever of serious disease of the cardiovascular apparatus preceding such an attack.

The attack of coronary thrombosis, unlike the typical anginal attack, often is not precipitated by effort. It frequently occurs during rest, while sitting quietly in a chair at a dinner table or during sleep. To be sure, ordinary or more unusual effort is also often found to be a precipitating factor. When the attack takes place, the patient is generally quickly aware that something terrible is happening. If he previously experienced anginal attacks, he knows that this is different from anything that he formerly has had, or if a patient recovers from one or more attacks of coronary thrombosis, he well recalls these spells and the very dates when they occurred.

From the moment the attack has begun until a period of several weeks has elapsed, death may occur at any time as a result of a great variety of causes. This will become clear as different complications are discussed. The physician very rarely sees those who die instantly. They become problems for the coroner, who has long been familiar with coronary disease as a cause of sudden death. If death is not instantaneous, we learn that the patient is taken with a severe pain, generally in the chest, although not infrequently in the upper abdomen. The pain is constricting or squeezing in character, and may radiate in the customary fashion to the neck, throat, shoulder, back or arms, more often to the left than to the right. The attack may be collapsing in character. Occasionally the patient actually falls, may become uncon-

scious, but more frequently has a sense of extreme weakness.

There frequently is vomiting at the onset of the attack, and it is this feature and the general feeling of distress that makes the patient, the family and the physician believe that the attack is one of acute indigestion, a term that should be given up entirely in medical nomenclature, especially when it ends fatally, for then it practically always is incorrectly used to describe an attack of coronary thrombosis.

Shortly after the attack has begun, the patient presents the picture of one suffering terrifically and seems to be in shock. He looks pale, is cold, and the skin has a moist, ashen gray color. The pulse will be found to be of small volume and rapid. There generally has occurred a fall of blood-pressure and this may continue to fall for several hours or during the subsequent days. Both the fall in pressure and the rise in heart rate are in marked contrast to what happens during an attack of angina, when the blood-pressure is apt to rise and the pulse rate remains essentially unchanged. In a small number of instances, the pulse may remain slow at the start and begin to rise after several hours or on the following day or so. Changes in the blood-pressure may likewise be delayed. Sometimes very quickly, or at other times only slowly, edema of the lungs may develop. Occasionally, the presenting feature is a patient with acute pulmonary edema. In most instances, a moderate number of moist râles can be heard at the bases of the lungs. In a short while the liver may become slightly enlarged from congestion and tender to pressure. In fact, at times the upper abdomen has a board-like rigidity similar to that which is seen in surgical conditions. At this time, the only striking feature in examination of the heart is the quality of the sounds, which become very weak. This is especially true of the first heart sound as heard at the apex, which becomes very faint and at times actually inaudible. Very commonly, there is a distinct gallop rhythm and an alternating pulse.

During the course of the first day or two several important developments occur. The pain gradually diminishes, though the patient complains of feeling weak. There may have been actual shortness of breath,



and at times Cheyne-Stokes breathing is noted. In most cases, a slight fever develops. The skin and mucous membranes may actually feel cold while a true fever is present. At the same time, a slight or a marked leukocytosis is apt to be found. Both of these features are probably dependent on the degree of infarction of the heart muscle and very likely represent a constitutional reaction to infarcted tissue. The fever and leukocytosis in coronary thrombosis can develop as soon as several hours after the attack and thereby can be helpful in early diagnosis. Pericarditis and the typical friction rub will be more often heard the more closely the heart is examined, but that does not mean that even most of these patients need show this sign. It will in some measure depend on the site and extent of the heart muscle involved. The fever and leukocytosis gradually disappear after several days and in some instances the patient looks and feels perfectly well. Even under such apparently favorable circumstances, the outlook may yet be grave, as death can come very suddenly.

In an uncomplicated case, after the pain has subsided, the patient remains weak, but an uneventful recovery takes place. The temperature and leukocytosis gradually disappear after a variable number of days. The pulse rate returns to normal rate and the blood-pressure, which had fallen with the attack, frequently remains low permanently, although it rises somewhat from the extreme levels that obtained during the early days. In others, the blood-pressure again becomes elevated. The various types of irregularities of the heart, which will be discussed later, all disappear, as well as the evidence of slight circulatory congestion, such as râles in the lungs and tenderness of the liver. The time for the apparently normal state to be resumed varies in different patients from a day or two to a few weeks, depending on the severity of the injury.

At any time after the onset, a great variety of complications may develop, of which a more detailed discussion will be taken up below. Whereas very little in the nature of treatment is necessary for those patients whose course is simple, much will depend on the proper recognition of the complications and the intelligent treatment of them.

It must also be borne in mind that although most of the cases do not present the picture that is generally seen in serious congestive heart failure, *i.e.*, marked pitting edema of the legs, ascites, hydrothorax, etc., yet some of the atypical cases have these signs and need treatment directed at them.

The physical signs that are present are in most cases of no particular significance, except for the general appearance of the patient, and this is of great importance.

On examination, the heart beat will be found so weak that no visible or palpable apex impulse can be felt in the majority of cases. In some, the apex beat will be made out definitely, and it is then apt to be found beyond the left nipple line. The rhythm of the heart will be dominantly regular in practically all the cases, although after the onset of the attack almost any type of irregularity may come and go. In almost half of the cases a slight or moderately loud systolic murmur can be heard, and very rarely an aortic diastolic murmur.

A point in the heart examination that is much more important than the presence or absence of murmurs is the quality of the heart sounds. The sounds are almost always muffled or distant. This is particularly true of the first heart sound at the apex. On several occasions it was actually found absent, while a distinct second sound could be heard. Occasionally, neither heart sound can be heard over the precordium, though when this is true, it is apt to be due to the noisy breath sounds that overshadow the heart sounds. The significant change is the muffling of the sounds, but particularly of the first heart sound. In addition, the rhythm may have a peculiar fetal quality, and what is still more important is the great frequency of a gallop rhythm. This is present in the majority of cases and comes with the acceleration in heart rate. It practically always disappears if a satisfactory recovery takes place, and the heart slows down to normal. This gallop is not necessarily due to a delay in the conduction of beats from auricles to ventricles, although such disturbance in conduction does at times occur. Further examination of the heart may show a pericardial friction rub. A distinct pulsus alternans is another frequent finding. This may be made out by palpating the radial

pulse, while taking the blood-pressure, or occasionally on auscultation of the heart. In many cases some enlargement of the heart can be made out by percussion, while in others the size will be found normal. One can see that of the above findings the evidence of hypertrophy and the presence of a systolic murmur are of little importance, as they are insufficiently distinctive, whereas, the extreme muffling of the heart sounds, the gallop rhythm, the pulsus alternans, and the pericardial friction rub are of considerable aid in diagnosis.

The *pain* is variously described by different patients. To some it will be a terrible pressure or load "like a ton of bricks hitting the chest," or "a death clutch in the chest or throat." To others, it will feel as if the chest were in a vise. Some cannot describe the pain and merely say, "It was just an awful pain." The pain is generally most severe at the onset, and in the course of several hours or days it gradually disappears. After this, in some cases, there is no pain whatever, while in others, there remains a mild ache in the center of the chest. In other patients the pain is not constant but rather lasts a few hours, then lets up, only to return and continue interruptedly for a few days. With the development of pericarditis there need be no additional pain. Generally at this time the severe pain has already disappeared, or if there remains the dull ache, it is not particularly altered when the pericardial friction rub is heard. The pain radiates similarly to the pain in angina. Very frequently there is an uncomfortable ache in the arms, more often in the left arm. It often extends directly through the chest to the back or up towards the neck and jaws, sometimes producing a clutching sensation in the throat. The most frequent site of the pain is between the two nipples, but almost any portion of the chest, from the epigastrium up, may be involved.

The pain does not let up in a few minutes as it generally does with an anginal attack, but, on the contrary, lasts hours or even days. Relief is not obtained by the use of nitrites, and with the very severe attacks even large doses of morphine given subcutaneously may give only slight relief. The agony may be so extreme that the patient will be tearing his flesh in an at-

tempt to get relief and crying for death to end his misery. In other instances, the pain is less severe and is associated with a feeling of a lump under the breast bone which, if it could be expelled, would end the attack. Often they are so agitated that they cannot lie down or be quiet, but prefer to pace the floor or thrash about. There are occasional cases in which the pain can hardly be described as severe. It may merely consist of a dull ache or an uncomfortable gnawing sensation in the chest that does not prevent the patient from continuing his work.

The most common difficulty in *diagnosis* that arises is to distinguish an attack of coronary thrombosis from one of angina pectoris. In most cases this can be done with a fair degree of certainty, while occasionally one will remain in doubt until one of the more critical and characteristic features of the disease is noted. At times it will be impossible to be certain just how seriously the condition should be regarded, and judgment will need to be held in abeyance. The important differences are the *duration and severity of pain* which in angina pectoris lasts minutes and in coronary thrombosis hours or days. In the one, relief is generally obtained by using nitroglycerine, in the other, no such prompt relief is obtained using nitrites or even morphine. The gradual fall in blood-pressure, the increase in the heart rate, the leukocytosis, the fever, the various irregularities of the heart, the occasional pericarditis, the embolic phenomena, the evidence of shock, collapse and congestive failure, and the development of dyspnea and gastric symptoms are all events which occur with varying frequency and characterize coronary thrombosis quite satisfactorily.

There are several other conditions that may be confused with coronary thrombosis and require special mention. Of considerable importance is the small group of patients who present a picture simulating an acute surgical condition of the abdomen. This was discussed in detail above, and here let it suffice to emphasize that in all patients about the age of 40 who have acute fulminating pain in the upper abdomen, the possibility of coronary thrombosis should be considered. Eliciting a previous history of angina pectoris, uncovering the fact that

although the pain is mainly in the epigastrium there is also a feeling of constriction in the sternum, or a squeezing ache in the arms, or the presence of some dyspnea during the attack, may lead one to make an accurate diagnosis. At other times, where possible, electrocardiograms or suspicious findings on auscultating the heart may save the patient from an unnecessary and perilous operation. In fact, there will be times when only after a most careful survey of all the features of coronary thrombosis will the correct diagnosis be made.

**TREATMENT**—At the outset, the cardinal symptom for which relief should be afforded if possible is the agonizing *pain in the chest*. For this, nitroglycerine, which had formerly helped the patient, will generally be useless. Large doses of **morphine** should be given subcutaneously. The first dose administered should not be less than  $\frac{1}{4}$  grain (0.016 Gm.), and it is useless to give it by mouth. In many cases it may be anticipated that more than this amount will be necessary, so that we have frequently given an initial dose of  $\frac{1}{2}$  grain (0.033 Gm.). The morphine should be repeated as freely and frequently as necessary. Often a whole grain (0.065 Gm.) can be given in a few hours. It must not be inferred that such large doses are always used, as frequently 1 or 2 injections of  $\frac{1}{4}$  grain (0.016 Gm.) afford relief. When this is obtained, the acute pain subsides, and although a dull sense of oppression in the chest may remain, the patient is apt to fall asleep. Should the pain return, or even in the absence of pain, if there is restlessness and wakefulness, and the respirations have not been particularly depressed by the morphine, it is desirable to give a further hypodermic injection to assure rest during the following hours.

In a large number of instances, no other medication is necessary. If the patient is in extreme agony, and the morphine proves to be of no avail, it is not inadvisable to administer light **ether** anesthesia.

With the onset of the attack there quickly develops a state of shock. The patient has a cold sweat, and there is the ashen gray appearance that is quite characteristic. The immediate question that comes up is the matter of stimulation. It is our belief that if the peripheral pressure

is sufficient to maintain even a comparatively feeble circulation, stimulation is to be avoided. There are instances where the pulse is absolutely or almost entirely imperceptible. Here the intravenous or intramuscular administration of large doses of **caffeine sodium benzoate** (0.5 to 1.0 Gm.— $7\frac{1}{2}$  to 15 grains), **strophanthin**, or **adrenalin**, intramuscularly, may be carried out. But in most cases, although the patient is in shock, the blood-pressure will still be sufficiently high. If the blood-pressure is 100 mm. or over, it is our belief that the relief of pain is all that is needed and that one should *avoid stimulation* if possible. The body, however, should be **kept warm** by the suitable use of **blankets** and **heating appliances**.

A consideration of what is taking place within the heart during the first hours and days of the attack is necessary to clarify and rationalize the treatment. At the outset, a coronary vessel is partially or completely occluded, with the resultant symptoms of pain and collapse. That portion of the ventricles that was supplied by that vessel begins to undergo infarction. Although the process probably begins directly, the important secondary changes like softening, rupture, local mural thrombus formation, and local aneurysmal formation take days to develop. It is mainly with regard to the dislodgment of an embolus from the ventricular thrombus and the rupture of the ventricle that stimulation of the heart is to be avoided. The more forcefully the heart contracts, the more likely it would seem that either of these 2 catastrophes might occur. It is logical, therefore, to welcome a sluggish contraction of the heart, provided the circulation be sufficient to prevent local stagnation and thrombosis and marked anoxemia. Inasmuch as rupture of the heart or embolic phenomena are not apt to occur the first few hours or even the first day of the attack, the problem of stimulation is different at this time than it is several days later. Whereas it may be necessary and safe to stimulate at the onset, it is generally inadvisable after the first day or two.

As in all heart conditions, the possible use of digitalis must be considered. We have, in general, entirely avoided the administration of digitalis. One reason for

this is that it is undesirable to stimulate the heart. Secondly, not much is to be hoped for from digitalis, for, under circumstances that prevail during an acute attack, the heart is regular and its rate will be little if at all influenced by digitalis. Finally, digitalis may possibly make more irritable a ventricle that is already irritable, as is shown by the occasional development of ventricular tachycardia. If the latter effect of digitalis is real, the possibility of ventricular fibrillation and death would be greater in the digitalized than in the undigitalized patients. It is true, furthermore, that many of our most successful recoveries have taken place in those cases where no digitalis whatever was used.

The problem is quite different during the first hours. When the patient is in collapse and the pulse imperceptible, there is as yet no danger of rupture or emboli and vigorous stimulation seems logical. What is actually accomplished it is very difficult to appraise. Many things are often done in quick succession in the hope that one of them might prove helpful, and if the patient improves we are at a loss to know which one of the drugs, if any, was effective. There is some basis, however, for believing that **caffeine**, **adrenalin** and intravenous **strophanthin** may be of help. The caffeine could be acting as a stimulus to the respiratory center, and in many instances there is marked dyspnea, the strophanthin or adrenalin might be exerting a supportive influence on the circulation. During these early days there are instances where edema of the lungs, respiratory distress and cyanosis are prominent. Under such circumstances, the inhalation of oxygen, preferably administered by means of an **oxygen tent**, may be of benefit merely as an aid in obtaining a better aeration of the blood. The value of oxygen cannot be great, but, nevertheless, it may make the patient more comfortable and ameliorate the symptoms of dyspnea and cyanosis, as it does in pneumonia.

If there develops evidence of congestive heart failure, such as pitting edema of the legs, engorgement of the liver, hydrothorax and the like, which is most apt to happen after the first 2 weeks and after the danger period of rupture of the heart and embolic dislodgment, it is best to digi-

talize the patient just as one does under similar circumstances when any patient has general circulatory insufficiency. This is particularly true if persistent auricular fibrillation occurs, as occasionally happens. In other words, following an attack of coronary thrombosis, the problem of ordinary heart failure may need to be met, and all the measures ordinarily employed, including **phlebotomy**, **digitalis** and **diuretics** are then to be used.

### III TREATMENT OF CARDIOVASCULAR DISEASE with Special Reference to **DIGITALIS THERAPY**

—Among the most difficult types of cardiovascular patients to secure satisfactory results are those with congestive circulatory failure and generalized edema to whom absolute rest with full digitalization have brought no relief. M. H. Barker and J. P. O'Hare (J. A. M. A. 91:2060 (Dec. 29) 1928) have studied the effect of **salyrgan** in a series of 30 patients with edema complicating the following conditions: Cardiorenal disease, 19 cases, nephrosis, 3 cases, malignant disease with ascites, 3 cases, cirrhosis of the liver, 2 cases, tuberculous peritonitis, 1 case, pleurisy with effusion, 1 case, and malignant disease with chylous pleural effusion, 1 case. From the study they have concluded as follows:

- 1 Salyrgan is a good diuretic with a wide range of usage and it is relatively non-irritating.

- 2 It is of particular value in circulatory failure and the ascites due to cirrhosis of the liver and chronic nephrosis. It may be of help in the ascites of malignant and inflammatory origin.

- 3 Salyrgan, like merbaphen, is much more effective in the presence of acid-forming salts, and the ammonium ion seems to be most effective.

when supplied as ammonium chloride or nitrate (in the dose of 8 to 15 Gm (2 to 3¾ drams) daily, started 3 to 4 days before the administration of the salyrgan)

In spite of the fact that *digitalis* is one of the most commonly prescribed and most useful of cardiac drugs, there prevails in the minds of many practitioners considerable confusion as regards its proper administration. William Withering in 1785 declared "Let it be continued until it either acts on the kidneys, the stomach, the pulse or the bowels." The essence of that statement must be strictly adhered to when prescribing *digitalis*, otherwise attempts at therapy will fail in many instances that might well be benefited. It makes no difference in what form the drug is prescribed—whether in the form of the tincture, the infusion, or the powdered leaves (in tablets or capsules), nor whether it is administered hypodermically, intravenously or rectally, nor whether the preparation is that of one manufacturer or of another. The vital point is that enough of the drug to ensure *full digitalization* must be administered before there can be any certainty that any particular preparation will not produce the desired effect in any particular patient. At times, however, the stage of full digitalization is signaled by the incidence of certain toxic symptoms, which may occur with or without the clinical improvement desired. Unless either clinical improvement or symptoms of toxicity appear, a sufficient amount of *digitalis* has not been given to judge correctly the efficacy of the preparation being used. It is always a matter of the amount of *digitalis* given, and not of the form in which it is

given. Of course, the stronger the preparation, the sooner will results be obtained. For example, to produce the same effects it will take 7 times as much of an infusion as of a tincture. Only preparations which have been properly assayed for biological potency should be used. Any deterioration of the preparation at hand can be readily offset by a corresponding increase in dosage. There is no advantage to be gained in changing from the brand of one manufacturer to that of another. Providing the dosage is sufficient, similar effect can be secured from a freshly prepared infusion or a properly standardized tincture, as from the powdered leaves prescribed in tablets or capsules.

**THERAPEUTIC EFFECTS**—In administering *digitalis*, what is the effect we wish to secure upon the patient's circulation? It is quite generally considered that chronic circulatory failure includes a slowing of the blood stream and a diminished cardiac output. In many patients, evidence of the circulatory stasis is seen in the engorgement of the superficial veins and in the physical signs of pulmonary congestion. S. Weiss and H. L. Blumgart (J Clin Investigation 7:11 (Apr) 1929), through actual measurements of blood velocity in heart disease, have shown that the rate of flow through the lungs is slowed in heart failure. It is hoped, therefore, to secure in each patient the most efficient circulation possible in the face of the pathologic and physiologic changes present at that particular time. Through the administration of *digitalis* benefit can be accomplished in 1 or all of 3 ways, described as follows

1 By slowing the heart rate, that is by lessening the number of ventricular systoles per minute, the diastolic period is lengthened, whereby ventricular filling is rendered more complete, and the heart muscle fibers are afforded more rest, and, as a consequence, there may result a greater expulsion into the circulation with each systole. Slowing of the pulse rate does not necessarily follow slowing of the ventricular rate. In some cases of auricular fibrillation, slowing the heart rate with rest and digitalis may actually bring about an increase in the pulse rate, by virtue of more impulses reaching the wrist through the strengthening of each ventricular systole. The apical rate in auricular fibrillation is of much greater importance than the pulse rate alone.

2 By increasing the cardiac tone, thereby relieving or preventing dilatation of the heart chambers beyond the physiologic limit, the optimum cardiac output is made possible. When the length of the heart muscle fibers is increased beyond a certain limit, the cardiac output is decreased, and "heart failure" is believed to result. Restoration of the fibers to a shorter length is a factor in bringing about an increase in cardiac output, with the possible return of circulatory efficiency.

3 Through increase of the extent of ventricular contraction, there tends to be an increase in cardiac output, when heart failure is present. Cohn and Stewart (J Clin Invest 6:53, 1928) have demonstrated that at any instant the cardiac output is the net result of the size of the heart chambers and the extent of ventricular contraction.

H J Stewart (Am Heart J 5:1 (Oct) 1929) suggest that recovery from heart failure, during rest and digitalis therapy, may thus be attributed to an increase in cardiac output, which results from more complete diastolic filling, following slowing of the rate, and from a simultaneous increase in the tone of the cardiac fibers and in the extent of ventricular contraction. With the improvement in the circulation, more blood enters the

coronary vessels, and there results better nourishment of the heart itself.

**TOXIC EFFECTS**—As previously mentioned, in some instances, before obtaining a complete restoration of circulatory efficiency, the point of full digitalization may be signalized by the development of toxic symptoms. These symptoms may indicate that the damage to the heart is of such type that, even with rest and full digitalization, it seems impossible to restore complete circulatory efficiency, or merely that the administration of the drug has been carried beyond the patient's tolerance. The symptom of toxicity most commonly encountered is nausea, or vomiting, which may be preceded by a period of anorexia, headache and vertigo. Nausea and vomiting are symptoms which all good digitalis preparations are capable of producing in the great majority of patients. Any preparation that is claimed not to cause nausea will also fail in its therapeutic effectiveness. Psychic vomiting, precipitated by the bitter taste of the drug, may follow the administration of but 1 or several doses of digitalis. Careful inquiry regarding previous medication will aid in differentiating this type of vomiting from vomiting caused by overdosage. Toxic effects on the heart may occur also in the form of extrasystoles, coupled rhythm, partial auriculo-ventricular heart block, complete heart block, paroxysmal tachycardia, or regular sinus rhythm becoming irregular or intermittent. The appearance of any symptoms of digitalis intoxication should be carefully watched for and calls for the immediate cessation of further dosage for at least 24 hours, until the untoward effects disappear.

TABLE 1—*Full Digitalization Doses*  
(Calculated by the Eggleston Body-Weight Method)

Weight, Lbs	Cat Unit per Pound of Body Weight	Total Amount of Tincture		Total Amount of Powdered Leaves	
		c c	Minims	Grains	Grams
40	0 15	6 00	90 0	9 0	0 6
60	0 15	9 00	135 0	13 5	0 9
75	0 15	11 25	168 75	16 8	1 125
100	0 15	15 0	225 0	22 5	1 5
125	0 15	18 75	281 25	28 1	1 875
150	0 15	22 50	337 5	33 75	2 25
175	0 15	26 25	393 75	39 3	2 625
200	0 15	30 00	450 00	45 0	3 0

*Note* To show more clearly the method of calculation, particularly the transfer from one denomination to another, the figures in this table have been allowed to stand at 2 or more decimal places

**CUMULATIVE ACTION, RATE OF ABSORPTION, AND PERSISTENCE OF EFFECTS**—In administering digitalis it is extremely important to realize that a certain amount must be accumulated in the body before any therapeutic effect will become evident. The drug is slow in affecting the heart, while, on the other hand, its action, after being instituted, is very prolonged. If the dose be repeated over a period of time, at a rate faster than that of elimination and destruction, the action of the drug becomes more and more marked (*cumulative action*). A. W. Bromer and H. L. Blumgart (J. A. M. A. 92:204 (Jan. 19) 1929) have demonstrated that the action of digitalis on the heart muscle fibers, as shown by changes in the T-wave of the electrocardiogram or by clinical improvement, begins between 2 and 4 hours after the administrations by mouth of a dose of 1 minim (0.06 c c) or more of a standardized tincture for each pound (450 Gm) of body weight, and reaches its maximum in from the sixth to the twenty-fourth hour. In auricular fibrillation the maximum effect has been found to persist for from 4 to 15

days after stopping the administration of digitalis. In view of the persistence of action, before beginning the administration of digitalis in large doses, it is of the greatest importance to make certain that the patient has not been taking digitalis for at least 2 weeks immediately preceding.

**ADMINISTRATION**—In how large doses should digitalis be given, and how rapidly may full digitalization be safely attained? The total amount of digitalis necessary for the obtaining of full therapeutic benefits may be calculated from the patient's weight, and the activity of the preparation, according to the *Eggleston method*. By this method the average total dose by mouth of a carefully standardized tincture is 0.15 c c (2.25 minims) per pound (450 Gm) of body weight, as shown in Table I.

In accord with the *Cat Method of Hatcher*, a tincture of full U. S. Pharmacopeia strength is one, of which 1 c c (15 minims) represents 1 cat unit. A cat unit is the amount of digitalis per kilogram (2½ pounds) of body weight which is required to kill a cat, when injected slowly and continuously intravenously. It is well to remember that the tincture of digi-

talis is a 10 per cent solution, and, therefore, that the quantity of tincture in minims is 10 times the same amount in grains of powdered digitalis leaves. Thus, 1 c c or 15 minims (from 30 to 60 drops) of the tincture is equivalent to  $1\frac{1}{2}$  grains (0.1 Gm) of powdered digitalis leaves. Quite often the inability to secure dull digitalization with the tincture arises from failure to realize that a dose measured in drops from an ordinary dropper must be from 2 to 4 times the same amount measured in minims (Minims are measured in a small graduated glass). By this method of calculation (as shown in Table I), to fully digitalize an adult of medium size (weighing 150 pounds) there will be required  $33\frac{3}{4}$  grains (2.25 Gm) of powdered leaves, or  $337\frac{1}{2}$  minims of a properly standardized tincture. It should be mentioned that children 4 years of age or older, weighing over 40 pounds, with heart disease, have been found to require about 50 per cent more digitalis per unit of body weight than would be required for adults, and that younger children, weighing between 16 and 40 pounds respond to digitalis as a rule, more readily than adults.

*Administration by Mouth*—There is no fixed method which must be followed in the administration of digitalis, however, it is well to have in mind the approximate total amount of the drug necessary for the obtaining of full therapeutic effects.

For patients suffering severe decompensation, under close observation, full therapeutic effects can be obtained in from 12 to 36 hours in the majority of cases by following the method of administration outlined by Eggleston. The total amount of digi-

talis required is calculated from the weight of the patient (making allowance for edema and excess adipose tissue), as shown in Table 1. One-third to one-half of the total amount required may be given at a single administration, to be followed in from 4 to 6 hours with one-fourth to one-third of the total amount. The remainder is then given in a few doses of small sizes at intervals of from 4 to 6 hours. Before giving the first dose, it is important to make certain whether or not the patient has been taking any digitalis during the 2 weeks immediately preceding, so that the size of the dose may be diminished, if necessary. The interval of 4 to 6 hours between doses allows time for complete absorption of each dose before the succeeding dose is given, thereby avoiding the danger of causing severe poisoning through overdosage.

In many instances, because of the inability to weigh the patient and also to judge correctly the weight of the edema, the average amount of drug necessary to secure full therapeutic effects in a patient of small size is estimated to be approximately 30 grains (2 Gm) of powdered digitalis leaves, or 300 minims of tincture, in a patient of medium size  $33\frac{3}{4}$  grains (2.25 Gm) of powdered leaves, or  $337\frac{1}{2}$  minims of tincture, and in a large patient  $37\frac{1}{2}$  grains (2.5 Gm) of powdered leaves, or 375 minims of tincture. For a patient of small size the schedule of dosage might be, as shown in Table 2, which is a slight modification of the original Eggleston method first mentioned.

According to this plan, the first dose consists of one-fourth of the total amount, and is followed in 4 hours by a dose of similar size. The remainder



TABLE 2—*Administration of Digitalis by Modified Large Dose Method*

Hour	Dose of Powdered Leaves		Dose of Tincture	
	Grams	Grains	c c	Minims
8 00 A M	0 5	7 5	5 0	75
12 00 (Noon)	0 5	7 5	5 0	75
4 00 P M	0 2	3 0	2 0	30
8 00 P M	0 2	3 0	2 0	30
12 00 P M	0 2	3 0	2 0	30
4 00 A M	0 2	3 0	2 0	30
8 00 A M	0 2	3 0	2 0	30
Total amount	2 0	30 0	20 0	300

is then administered at the rate of 3 grains (0 2 Gm) of powdered leaves, or 30 minims (from 60 to 120 drops) of tincture every 4 hours. At the end of 24 hours the last dose of the series is given. A smaller dose of  $1\frac{1}{2}$  grains (0 1 Gm) of powdered leaves, or 15 minims (from 30 to 60 drops) of tincture, might be given to the less ill patients, full digitalization being attained on about the third day. The administration of the drug should be continued at the rate of  $1\frac{1}{2}$  grains (0 1 Gm) of powdered leaves, or 15 minims (from 30 to 60 drops) of tincture, 3 times daily, until there is evidence of digitalis action either in clinical improvement or in the appearance of minor toxic symptoms.

In the treatment of patients who are not in imminent danger of failure, such as patients seen in office practice, or in hospital out-patient clinics, rapid digitalization is not indicated. Doses of either  $1\frac{1}{2}$  or 3 grains (0 1 or 0 2 Gm) of powdered digitalis leaves, or 15 or 30 minims (from 30 to 60 or from 60 to 120 drops) of tincture, may be given 3 times daily, or as often as every 4 or 6 hours, until the signs of digitalis action appear. In each case the total amount of drug necessary to obtain full therapeutic effects should

be estimated and borne in mind. By this method full digitalization may be effected in from 3 to 7 days, depending upon the size and frequency of doses. Because of the length of time required, it is easy to avoid precipitating distressing nausea or vomiting, or other symptoms of toxicity.

*Maintenance of Full Therapeutic Effects*—After the stage of full therapeutic effects has been attained, the patient can be kept in the state of optimum benefit through the daily administration of from  $1\frac{1}{2}$  to 3 grains (0 1 to 0 2 Gm) of powdered leaves, or from 15 to 30 minims (from 30 to 60 or 60 to 120 drops) of the tincture of digitalis. The amount of digitalis effect that disappears from the body each 24 hours has been found to average  $2\frac{1}{4}$  grains of powdered leaves, or 22 to  $23\frac{1}{2}$  minims (from 45 to 90 drops) of tincture. Because of variations in individual susceptibility to digitalis, in the ability of absorption of different individuals, and in the absorbability of different preparations, it is impossible to state the exact amount of the drug which will meet the maintenance requirements of every patient. For some individuals the daily requirements may be an amount as small as 1 grain of powdered leaves,

or 10 minims (from 20 to 40 drops) of tincture, while in other cases the amount may be as much as 4 grains of powdered leaves, or 40 minims (from 80 to 160 drops) of tincture. Each patient must be followed carefully, in order that the dosage be adjusted to his or her particular needs. After the daily maintenance dose has been determined, it may be used regularly for a long period of time without further change.

*Intramuscular, Intravenous and Rectal Administration*—Administration of digitalis by routes other than by mouth is at times indicated. Administration intramuscularly, or rectally, is frequently necessitated when the patient's stomach is intolerant for reasons other than digitalis overdosage, or when the patient is not able to swallow.

When given intramuscularly, the same principles which govern the size and frequency of dosage by mouth must be followed in order to secure real benefit. As usually practiced, dosage intramuscularly is too small. There are various preparations on the market in sterile ampules or vials for hypodermic use. Since intramuscular injections of digitalis preparations are irritating, and since absorption is no more rapid and no more complete by this method of administration, administration by mouth should be adopted whenever possible.

Intravenous administration is dangerous, and is used only in emergencies for patients *in extremis*. A preparation of **strophanthin** is usually used. Amorphous strophanthin may be given in doses of 0.5 milligram ( $\frac{1}{120}$  grain), and may be repeated, if necessary, once in 24 hours. Crystalline strophanthin (**ouabain**) is more

toxic than amorphous strophanthin, and, therefore, the dose is half as large. Intravenous administration should be done only by competent observers under carefully controlled conditions, after having made absolutely certain that the patient has not received any digitalis for at least 2 weeks immediately preceding.

Excellent results can be obtained through the administration of the daily amount of digitalis in 2 to 4 doses, as retention enemata, each dose diluted in 50 to 100 c c ( $1\frac{2}{3}$  to  $3\frac{1}{3}$  ounces) of normal saline solution. Rectal administration should be used only when the drug cannot be taken by mouth.

**INDICATIONS AND LIMITATIONS**—Much too frequently digitalis is accredited with too far-reaching power as a cardiac drug. Benefit is often looked for in every condition where general stimulation is seemingly indicated, even though there is no evidence of cardiac disease. Such ideas are distinctly erroneous. Digitalis is not a circulatory stimulant for ordinary use. Its use is indicated only where there are signs of cardiac failure.

The value of digitalis therapy in *auricular fibrillation*, with or without signs of decompensation, is well understood. Great benefit is also effected by the use of the drug in *valvular heart disease* with congestive failure, and in failure with hypertrophy, associated with regular rhythm, rapid or slow. It is also of value in changing *auricular flutter* to fibrillation, with subsequent slowing of the rate. Slowing of the rapid heart with regular rhythm, without signs of decompensation, does not occur, as a rule, without other symptoms of

severe digitalis poisoning Though contraindicated in partial auriculoventricular heart block, it may be of distinct benefit in *complete block* when signs of decompensation are present

The presence of high blood-pressure does not serve as a contraindication to the use of digitalis in chronic heart disease Excellent therapeutic results often follow the administration of the drug With the re-establishment of circulatory efficiency, there may be a definite lowering of both the systolic and diastolic pressures, particularly the latter

### CATARACT.—ETIOLOGY.—

**HEREDITY**—In a family of father, mother and 8 children, S Werner (Finska lak sällsk handl 70 1029 (Dec ) 1928) found cataract and curly hair in the father and 3 of the sons, the other children having straight hair and no signs of cataract The cataract appeared in the father in one eye at the age of 22, in the other at 49, and in the sons at 23, 28 and 20 years, respectively In 1 son the cataract was zonular, in the other cases the original type could no longer be seen Dominant transmission of the cataract seems to Werner probable, the father being heterozygote with regard to the cataract factor The inheritance of a disorder apparently hitherto latent in a family is assumed to be due to a so-called conditional factor In this family a factor which causes curly hair appears to be coupled with the cataract factor

**CONGENITAL CATARACTS—RELATION TO AMBLYOPIA**—W F Boiler (Jour Iowa M Soc 19 491 (Nov ) 1929) suggests the following means of combating amblyopia in congenital cataracts

Congenital cataract which obstructs vision should be **operated upon early**.

The patient should wear **correcting lenses** as soon as possible

If squint still persists and the patient is under 5 years of age, **orthoptic treatment** should be instituted to develop the fusion faculty

If the position of the eye precludes orthoptic training, operation should be resorted to so that exercises may be prescribed

**PATHOLOGY**—While many new studies on cataract have been made in recent years, there is still much to be learned, according to I S Tassman (Arch Ophth 57 361 (July) 1928), regarding the various chemical changes taking place in the proteins of the lens It is now known, however, that the total proteins constitute about 35 per cent of the lens mass and consist of a soluble and an insoluble portion The soluble portion makes up 52 per cent of the total mass, and the insoluble portion, 48 per cent The soluble portion contains alpha crystallin, beta crystallin and an albumin The alpha crystallin forms 37 per cent, the beta crystallin, 63 per cent and the albumin, 1 per cent of the soluble protein The alpha crystallin is found mainly in the external or cortical part of the lens and the beta crystallin mostly in the more central part The albumin shows no noticeable distribution The insoluble protein or framework is found to increase from within outward

Lens proteins, like other proteins, yield a positive reaction with sodium nitroprusside and ammonia In this reaction, the beta crystallin is stronger than the alpha crystallin and the insoluble albuminoid is negative The reaction is said to depend upon the

presence of cystein Its intensity decreases as the 2 crystallins vanish from the lens until, in mature cataracts, it becomes entirely absent. This seems to suggest that opacities follow a reduction of the soluble crystallins, but our knowledge regarding the relationship of the chemical changes in the proteins of the lens to the pathogenesis of senile cataract is still incomplete [Since the cause of senile cataract is not agreed upon, work of this character is of value in bringing new light on the nature of the changes which may affect the lens protein—Ed ]

**BLOOD CHEMISTRY**—The *blood sugar* tolerance was studied by E R Blaisdell (New England J Med 200 768 (Apr 11) 1929) and the blood-pressure was recorded in 100 patients with cataracts With the exception of 9 known to have diabetes, all were given 100 Gm ( $3\frac{1}{2}$  ounces) of dextrose on a fasting stomach, and the blood sugar was estimated 2 hours later Twelve patients had a carbohydrate tolerance below normal, while 31 patients had a systolic blood-pressure above 150 millimeters

Chemical blood analyses were made by C S O'Brien and V C Myers (Arch Int Med 42 376 (Sept) 1928) in a series of 54 cases of cataract It was found that the blood was essentially normal except for the *cholesterol* content, which was somewhat increased in 54 per cent of the cases

**TREATMENT.—NON-OPERATIVE**—Z H Ellis (Arch Ophth 57 46 (Jan) 1928) discusses the work of Davis, and Guyer and Smith A E Davis reported improvement in cases of cataract from treatment with **lens**

**antigen** Guyer and Smith found that when lens tissue of rabbits and mice is injected into fowls it causes the production of antibodies, and that when the serum of these fowls is re-injected into rabbits and mice it may attack the lens of the young in utero [This work has been disproved by T A Davis—Ed ] It has no effect upon the lens or other orbital contents of the mother A E Davis suggested that a solution of the emulsified lens of an animal injected into man might cause the active formation of antibodies which would cause the absorption of lens opacities Ellis treated the following types of cataracts with lens antigen according to Davis's directions traumatic, 2, cortical, 15, sclerosed nucleus, 5, diabetic, 4, and cataract complicating glaucoma, 1 In 14 cases, the cataract progressed, and in 13, no change in its progress was noted In no instance was there absorption of the cataract or improvement of vision

This subject has also been studied by C Berens, R R Losey, L H Hardy, and R L Meek (Atlantic M J 30 547 (June) 1927) who point out that specific therapy with **lens antigen** was first used by Romer in 1908 for the treatment of patients with cataract A E Davis (Tr Internat Cong Ophth, 1922) published his researches and experiences in the treatment of cataract with **antilens serum** and **lens antigen**, and concluded that immature cataracts may be arrested in 90 per cent of the cases in which there is 50 per cent loss of function. Jackson's (Tr Am Ophth Soc 22: 85, 1924) statistical study of his cases treated by hygienic measures alone, makes one conservative in evaluating results of lens-antigen treatment He

TABLE 2.

RESULTS OF LENS-ANTIGEN TREATMENT OF CATARACT (Berens-Losey-Hardy-Meek)

Case No , Initials and Diagnosis	Date of First Treatment and Vision	Total Quantity Injected and No of Injections.	Vision and Date of Last Examination	Remarks
No 1, Mr V Immature cataract	11-4-25 V c c O D aphacic O S 20/30	Injections twice weekly About 80 injections, totaling 500 c c	9-17-26 V O D aphacic O S 20/50+3	Peripheral change Ap- parently improved. Nuclear changes more marked Vision failed.
No 2, Mr G G Immature cataract	12-18-25 V c c O D 20/30 O S 20/100	Injections twice weekly Eighty injections, total- ing 500 c c	9-17-26 V c c O D 20/50 O S 15/200	Lens opacities increased Vision decreased.
No 3, Mrs Y Immature cataract and glaucoma	2-9-25 V O D no light O S 20/200	Injections twice weekly About 70 injections, totaling 450 c c	10-1-26 V O D no light O S fingers, one foot	Cataracts complicated by glaucoma Vision decreased
No 4, Mr C F Immature cataract	1-25-26 V c c O D 20/40 O S 20/70	Three injections a week Eighty injections, total- ing 500 c c	9-18-26 V c c O D 20/50 O S 20/100	Lens opacities increased Vision decreased
No 5, Mrs B Immature cataract	2-1-26 V c c O D 20/200 O S 20/30	Three injections a week About 80 injections, totaling 500 c c	10-2-26 V c c O D 18/200 O S 20/40+1	Lens opacities increased Vision decreased
No 6, Mr A V Immature cataract	12-17-25 V c c O D 20/50 O S 20/40	Three injections a week About 105 injections, totaling 700 c c	10-2-26 V c c O D 20/50 O S 20/70	Apparently no change in O D Lenticular opacities increased in O S
No 7, Mr J R Mature cataract O D Immature cataract O S	12-19-25 V c c O D light per- ception O S 20/30	Three injections a week About 100 injections, totaling 650 c c	9-28-26 V O D light per- ception O S 20/30	Apparently no change in either eye.
No 8, Mr A K Immature cataract	2-21-26 V O D 20/20 O S 20/50	Three injections a week About 100 injections, totaling 500 c c	9-28-26 V c c O D 20/30 O S 20/50	Lens opacities increased Vision decreased
No 9, Mr H C Immature cataract	11-7-25 V O D 20/70 O S 20/30	Three injections a week About 110 injections, totaling 530 c c	10-5-26 V c c O D 20/100 O S 20/40	Lens opacities increased Vision decreased

has shown that patients averaging 65.35 years who have commencing senile cataract will live, on an average, 15 years before they will be unable to read fine print

Berens and his associates (*loc cit*) believe lens-antigen treatment should be tried by a group of observers, even though its effect may not be specific. It apparently does no harm, and non-specifically may raise cell resistance which may retard the progress of cataract, if cataracts are due to toxins as originally suggested by Romer's experimental studies. They have used lens antigen and dionin in the treatment of 9 cases tabulated in Table 2. In 1 case there was no increase in the lens opacities and the vision was un-

changed, but in the other 8 cases the lens opacities increased and vision decreased. Definite conclusions cannot be drawn from this small number of cases but their study suggests the possibility that dionin and lens antigen have little effect in arresting the progress of lens changes in the absence of thorough medical diagnosis and treatment.

Subconjunctival injection of 2 drops of a 1:1000 adrenalin solution occasions a maximal mydriasis, lasting 4 to 6 hours, which remains present despite opening of the chamber. St. Martin (Presse méd 36 728, 1928) was able to convince himself in a series of 50 operations, that the extraction of the cataract is extraordi-

narly facilitated, and recommends the systematic use of this method in cataract operations. This method is objected to on the grounds that peripheral iridectomy cannot be performed, but this theory has been disproved in several cases operated on by C Berens.

#### SURGICAL TREATMENT.—

R R James (Brit J Ophth 12 259 (May) 1928) gives an account of **Warner's operation** for cataract as described in Chandler's "Treatise on the Diseases of the Eye" published in 1780. With the patient seated before him, the surgeon depressed the lower lid while an assistant held the head and upper lid. The section was then made downward and outward. The capsule was incised and the globe pressed upward to allow the cataract to be squeezed through the pupil. After the operation, cold dressings were applied and changed 2 or 3 times daily. During the inflammatory stage, fomentations were applied and opiates administered. After the operation the patient was kept quiet in bed for several days to allow the wound to heal and the aqueous to re-form.

The technic of P L Pavia and M Dusseldorp (Am J Ophth 10 661 (Sept) 1927) for cataract extraction differs from the usual method in the following particulars. The formation of a **conjunctival bridge** which is sutured after the extraction, maximal dilatation of the pupil with homatropine and cocaine before the operation, and the instillation of eserine immediately after the operation, the injection of milk immediately after the operation and again on the third and fifth days. The importance of thorough anesthesia is emphasized.

The method described has been used in 100 cases without a single loss of vitreous or post-operative infection. In every instance it was followed by rapid and uneventful healing.

L W Fox (J A M A 89 2249 (Dec 31) 1927) states that when the periphery of the lens is clear in *congenital* cataract he does a small **optical iridectomy** in the nasal side of each eye (cataract usually bilateral), placing it so as to permit perfect binocular fixation. This is done under general anesthesia. When capsular remains persist after previous needlings, he removes the remnants by gentle traction through a corneal incision. He states that removal of the lens intact is ideal but not always practical.

A brief history of **intracapsular extraction** of cataracts is reported by H M Morton (Am J Ophth 12 90 (Feb) 1929). The author believes that a round pupil is essential for an ideal cataract operation. In his last 26 intracapsular extractions, he performed an **iridectomy** only once. In the 25 cases without an iridectomy the visual results were good. In 18, the pupils were perfectly round. In 7, there was iris incarceration, but this seemed to have little effect upon the vision.

In Morton's technic, an 8 per cent **cocaine** solution with **adrenalin** is instilled 4 times, and the pupil is dilated by **atropine** unless there is increased tension.

O B Nugent (Arch Physical Therapy 10 267 (June) 1929) reports on the **Barraquer method** of extracting cataracts by suction as simplified by Fisher of Chicago. **Fisher's operation** is described as follows. Incision with conjunctival flap, the placing of

a suture in the flap which is left untied until the lens has been delivered; the delivery of the lens by lifting it direct from the eye *without turning it over*, making the peripheral iridectomy after the pupil is more contracted and suture tied which gives more support to the eye, and by which the possibility of loss of vitreous is lessened.

Nugent has been performing the modified Fisher-Barraquer operation for about 2 years and has found the results to be far better than with any other method

**SURGICAL COMPLICATIONS**—L Mills (J A M A 91 1979 (Dec 22) 1928) discusses post-operative iritis and prolapse of the iris. *Post-operative iritis* is of 4 types (1) traumatic iritis, (2) endophthalmitis phaco-anaphylactica, (3) endogenous iritis, and (4) exogenous iritis

*Traumatic iritis* is caused by rough or excessive manipulation of the tissues, irritation from hard fragments of lens remaining in the eye, tissue inclusions in the wound due to poor operative technic, pressure and drag on the incarcerated iris tissue, and a drag on the intact iris by herniation of the vitreous into the anterior chamber

*Endophthalmitis phaco-anaphylactica* may be prevented by careful expression and irrigation of loose lens cortex and in some cases by irrigation of the anterior chamber with warm half-normal saline solution (Reese), which gives definition to the lens substance that otherwise is not visible. Mills states that in his experience irrigation has never been followed by iritis

*Endogenous iritis* develops from one to several weeks after any form of cataract operation as the result of un-

recognized focal or systemic disease such as dental abscesses and intestinal infections

*Exogenous iritis* is due to infection of the tear sac and bacterial invasion by way of tissue incarcerated in the wound

*Prolapse of the iris* may be primary or secondary. Primary prolapse is due to prolonged fixation of the globe and iris following the knife blade through the incision. Secondary prolapse is caused by trauma due to awkward operative manipulations, excessive pressure, too small an incision, the pressure of defective dressings, meddlesome and too early inspection of the wound, strains and assaults during convalescence, defective incisions, delay of healing, and the omission of iridectomy

More American ophthalmologists are beginning to agree with Mills that the treatment of the incision in cataract surgery has been out of line with the treatment of other presumably clean operative wounds, *i e*, full suture of the wound to prevent infection and restore the normal relations. Failure to suture the operative wounds of the eyes has been the chief single cause of infection from without and the extrusion of the intraocular contents. These complications may be avoided, as he suggests, by covering the wound with a narrow but complete flap of conjunctiva formed during the incision or before, closing the flap over the sclerocorneal wound, and fixing it with about 5 interrupted sutures placed with regard to the peculiarities of the wound. Many methods of suturing the wound have been suggested and the surgeon should select the one best adapted to his technic

E B Dunphy (J A. M. A. 89 2254 (Dec. 31) 1927) reviews 2560 cases of cataract extraction with the object of classifying the complications with the several types of operation and determining whether *loss of vitreous* makes any considerable difference in the ultimate results. The complications were prolapse of the iris, infections, expulsive hemorrhage, and loss of vitreous.

Dunphy (*ibid*) concludes that loss of vitreous would occur much less frequently if every eye with cataract were properly anesthetized by means of the Van Lint injection combined with either a deep orbital or a subconjunctival injection. His records show that of the cases with loss of vitreous, 62 per cent were operated upon before this practice was adopted.

An inquiry into the occurrence and effects of *vomiting* after cataract extraction has been made by F W Law (Brit J Ophth 13 358 (July) 1929) in 141 cases. The operation was followed by vomiting in 15. Twelve of the patients with post-operative vomiting were women. The vomiting had an unfavorable effect in 5 cases, in 2, it was followed by prolapse. In 10 other cases prolapse occurred without discoverable cause. The author does not approve of pre-operative starving of the patient as he finds that vomiting is less likely to occur when the patient is well fed.

**RESULTS OF CATARACT EXTRACTION.**—R C Davenport (Brit J Ophth. 12.85 (Feb) 1928) analyzed all the cataract extractions performed at Moorfields Eye Hospital during the years 1919-1925, and compares them with a similar analysis made at this hospital by Devereux Marshall for the years 1889-1893. By

far the most popular technic employed in the recent series is **extraction with peripheral iridectomy**. The losses from acute infection appear to be considerably lower in recent years. With regard to visual results, those with simple extractions and those with peripheral iridectomies are better than those with complete iridectomy, but against this must be remembered the fact that at the present time complete iridectomy is often performed in complicated cases. Compared with the earlier series prolapse of the iris is more common in all forms of technic. This may be explained by the more frequent extraction of immature cataracts. The visual results after iris prolapse are, however, better in the recent series. Vitreous loss is about the same in both series, and was considerably more common after complete iridectomy. Only 4 cases of sympathetic ophthalmia occurred in the recent series, as compared with 8 in the earlier series. There were a great many more needlings necessary in the recent series, probably again owing to the greater number of immature cataracts operated upon nowadays. The total number of cases in the 1889-1893 series was 1519, and in the 1919-1925 series 2368.

### CEREBRAL SPASTIC PARALYSIS.—TREATMENT.—H.

Theodore Simon (New Orleans M and S J 80 622 (Apr) 1928) relates the history of an operation which was first introduced by Adolf Stoffel in 1910. It consists in partial section of the peripheral nerves so that part of the muscle becomes paralyzed and the other part remains spastic, a condition resulting in a weakened but better balanced muscle. A Bruce Gill



(J Orthop Surg 3 52 (Feb) 1921) reported 32 cases of spastic paralysis so treated with marked improvement. Simon performed 43 operations on 12 patients in the last 4 years, with excellent results in some of the patients. The results are much better in the nerves of the lower extremities as compared with the nerves of the upper extremities.

**CESAREAN SECTION.**—The development of obstetrics is an account of one of the most interesting passages in medical history, and there is no chapter in obstetric literature more absorbing than that dealing with the operation of Cesarean section. As a life saving measure, no obstetric procedure, probably, is comparable to this operation.

Notwithstanding its high standing, there are certain features associated with the procedure that detract from the exalted plane it should hold in obstetric practice. It is the most spectacular operation in the entire realm of obstetric surgery, and this has led to its adoption in an unwarranted number of instances.

Probably no other major surgical procedure can be performed with equal facility, and this, together with its apparent simplicity, has led to its rather wide performance by those technically ill qualified, or still worse, woefully lacking in an appreciation of its true indications.

As simple as it is, it is no operation for the tyro, and when performed by those unskilled, it leaves in its wake a definite train of morbidity and mortality. If the operation, therefore, is not performed by those thoroughly conversant with technical surgery, it is fraught with real danger, both im-

mediate and remote. The tendency, however, to minimize the operation, still prevails. As a result, there has developed an ever enlarging group of so-called indications embracing almost every obstetric complication. It has been well said that the widespread employment of Cesarean section has been in inverse proportion to the judgment and skill possessed by the individual operator.

Since accumulated evidence has demonstrated that the operation is by no means the safest or easiest way of overcoming all obstetric difficulties, the unrestrained enthusiasm until recently prevalent, has gradually, though tardily enough, been meeting the check it deserves.

This phase of the matter, has, within the last 2 or 3 years, received considerable literary attention. Since the primary mortality under the most favorable concurrence of circumstances is 4 times greater than in normal labor, and in some of the obstetric emergencies may even rise to 25 per cent or more, numerous attempts have been made to develop a more satisfactory and life saving technic, especially in patients potentially or frankly infected.

**INCIDENCE AND MORTALITY —INTRODUCTION** —To illustrate the variability one finds in the percentage of Cesarean operations performed in different institutions with the mortality resulting therefrom, the following reports are quoted, which confirm what has already been said about the difficulties of this operation.

In the Jefferson Medical College Hospital, the incidence of the operation for the 2 year period, from 1927 to 1929, is found in the table appended on the following page.

	No of Deliveries	No of Cesareans	Percentage	Mortality Per Cent
Private	770	54	7 0	5 5
Ward	1266	42	3 3	4 7
Out-patient	1400			
Total	3436	96	2 8	5 2

Welz analyzed the sections performed in Detroit for the year 1925, and found an average of 1 operation for every 117 births. The maternal mortality was 13 per cent, and the fetal, 11 per cent.

In an analysis of the Cesarean deliveries, performed in the city of New Orleans (New Orleans M and S J 79 815 (May) 1927), between 1921 and 1926, the incidence was 1 in 56 deliveries. During the period mentioned, 291 operations were performed with a maternal mortality of 16.1 per cent. Thirty-one low operations were performed with no death of mothers.

Fifteen per cent of the puerperal deaths in the Charity Hospital, New Orleans, from 1921 to 1928 inclusive, followed Cesarean section.

Schweitzer reports 236 cervical operations with a maternal death rate of 2.5 per cent, and a fetal mortality of 4 per cent.

According to Greenhill, 731 low sections were performed in the Chicago Lying-in Hospital between 1915 and 1928, with 9 maternal deaths, a mortality of 1.2 per cent. Repeated sections were performed on 93 patients, with 2 deaths, a mortality of 1.2 per cent.

From the Hospital of the University of Pennsylvania, J C Hirst, 2d (Am J Obst and Gynec 18 773 (Dec 1929), reports 84 consecutive operations among 1279 patients in the 2½ year period ending September, 1928, an incidence of 6.5 per

cent. During this period, 2700 women were delivered in the out-patient department, 14 by Cesarean section, an incidence of 0.5 per cent. Thus, among the hospital and home patients, a total of 2.4 per cent. were delivered through the abdominal route.

C B Lull (Am J Obst and Gynec 17 403 (Mar) 1929) reports 109 classical Cesarean section operations among 2161 deliveries, an incidence of 5.0 per cent, with a death rate of 6.4 per cent.

F Ivens (Brit M J 2 1166 (Dec 29) 1928) reviewed 295 classical sections and found a maternal death rate of 1.3 per cent and a fetal of 8.5 per cent.

W Thompson (Am J Obst and Gynec 19 392, 1930) made a survey of 1322 abdominal deliveries performed in the 12 largest hospitals in Los Angeles from 1923 to 1928 inclusive. These comprised 1060 classical and 262 low operations. The maternal mortality for the former type was 4.1 per cent and for the latter type 4.9 per cent.

Statistics from the New York Lying-in Hospital show an incidence of 1 abdominal delivery in 585 births, from Johns Hopkins, 1 in 77, Potter reports an incidence of 1 section in every 14 deliveries.

**INDICATIONS AND LIMITATIONS.**—The great variability one observes in the percentage of sections reported in the literature seems to indicate a very marked division of

opinion as to the justifiable indications for the operation. Since it is universally conceded that the operation has been performed to an almost unjustifiable degree, it is absolutely incumbent that the indications in all instances be placed strictly in what one might call a legitimate category.

At the outset it may be said that Cesarean delivery may be employed in any condition, except convulsive intoxication, in which the effect of labor would seriously threaten the life of the prospective mother, her child, or both.

Under this rather broad heading may be included

1 Pelvic deformity (congenital or acquired)

2 Placenta previa

3 Premature separation of the placenta

4 Elderly primigravida, especially in patients with moderate pelvic contraction

5 Chronic constitutional disease

6 Neoplastic or stenotic barriers of the birth canal

7 Neoplastic or other forms of obstruction involving the reproductive organs and other organs adjacent thereto (namely, the bladder and the bowel)

8 Certain types of fetal deformity associated with disproportion or abnormal presentation

9 Eclampsia (only under the narrowest limitations)

A discussion of the more important indications follows

(1) **PELVIC DEFORMITY**—It is uniformly conceded that gross pelvic deformity, or frank obstruction from other conditions, are clear indications for the procedure.

Pelvic deformity of sufficient ex-

tent to offer an obstructive barrier to fetal exit is the chief and hence the most frequent criterion for abdominal delivery. It is for this complication, anticipated or encountered, that more than 50 per cent of the operations are performed. It is generally agreed that the operation in pelvic contraction has been more or less abused and that its employment must be restricted.

A trial labor with a view of terminating it by Cesarean section, should the head fail to engage or descend, has received considerable advocacy.

H. Bailey and H. C. Williamson (J. A. M. A. 89:2085) (Dec. 17, 1927), in a study of 11,491 deliveries in the Cornell teaching service at Bellevue and the Berwind Clinic during five years from 1922 to 1927, found 676 patients with pelvic contraction (conjugate vera of less than 9.5 cm. or bischiatric diameter of less than 7 cm.), an incidence of 5.8 per cent. With the exception of 5 cases of absolute contraction and 24 elective Cesarean sections, the patients were given a trial labor. This consisted of 12 hours of hard pains without vaginal or rectal examination. In 66 per cent delivery was spontaneous, while 10 per cent of the operative deliveries required section, making a total of 14 per cent operated upon for contracted pelvis. If no engagement of the head occurs after 12 hours of hard contractions, a cervical Cesarean section should, they claim, be employed.

An arbitrary time limit, however, for the trial labor is somewhat untrustworthy. One must be guided by the progress a given patient makes rather than by time, but with no progress at the end of 12 hours of

hard firm contractions, it would seem unwise to confide in nature's methods alone. The pendulum of conservatism, however, must not be allowed to swing too far, as under conditions of actual inequality between the fetal skull and pelvic inlet, neither the mother nor the child is benefited by quibbling. A grossly contracted pelvis, if not recognized, becomes one of the most dangerous complications of labor, to both the mother and her baby. One must remember, also, that every hour after rupture of the membranes, and especially after vaginal manipulation, adds to the morbidity and mortality, in the event of abdominal delivery becoming a necessity.

One may also assume a similar attitude with respect to cases of gross obstruction due to neoplastic disease of the uterus or ovaries, or stenotic obstruction, congenital or acquired, involving the cervix or vagina.

(2) **PLACENTA PREVIA** —In considering antenatal hemorrhage, one may be more or less axiomatic and say that it cannot be successfully controlled, as a rule, by an expectant policy. In all cases of placenta previa, especially in primigravidæ, with the cervix uneffaced or only partially dilated, delay in instituting steps to empty the uterus by the most expeditious route possible will certainly court disaster, not only for the fetus, but in a very definite percentage of cases, for the mother as well. It is in cases of this type that one finds a truly rational indication for elective abdominal delivery.

Because of the occasional association of fetal maldevelopment with placenta previa, one should not too

strongly advocate abdominal section in the interest of the baby without making reasonably certain, by x-ray study, if possible, that an anomaly of this type does not exist.

Comparative figures show that Cesarean section is warranted as a routine plan of treatment for most cases of placenta previa, although, in certain others, vaginal delivery may be employed. It is important to mention that patients with placenta previa unsuitable for operation are those frankly infected or those gravely anemic from blood loss, although the procedure may be extended to include many of the latter, provided a free infusion of whole blood, as advocated by Bill, be administered prior to or during the operation.

J. P. Greenhill (Surg., Gynec. and Obst. 50 113 (Jan.) 1930) reports a series of 118 patients with placenta previa, in which section was performed 42 times without a single maternal death. Eight of the operations were of the classic and 34 of the low cervical type. In the non-operative group, the maternal mortality was 39 per cent.

A. H. Bill (Am. J. Obst. and Gynec. 14 523 (Oct.) 1927) records a series of 45 cases in which section with transfusion was only occasionally performed, with a maternal mortality of 11.1 per cent. He compares this group with a series of 56 patients, 40 of whom were transfused and then operated upon, with only 1 death.

Frey (Zentralbl. f. Gynak. 52 2485, 1928) similarly reports a series of 48 consecutive cases of placenta previa, all of which were delivered by Cesarean section with but 1 maternal death.

O. Korthauer (Zentralbl. f. Gynak.

51 1434, 1927) published a series affording a comparison of various methods employed. The maternal death rate for patients delivered by version and extraction was 50 per cent, for those delivered by Braxton Hicks version, 11.1 per cent and for those on whom Cesarean section was performed, only 6.9 per cent.

Figures collected by Bourne show a maternal mortality in central and marginal placenta previa of 17.7 per cent following delivery through the natural channel and only 5.9 per cent following section.

The fetal death rate in vaginal delivery is recorded as 7.6 per cent in the central and marginal varieties, and 5.0 per cent in the lateral form. Following Cesarean section in the central and marginal types, the rate is recorded as 3.4 per cent, and in the lateral variety as 3.0 per cent. These figures prove conclusively that both the maternal and fetal mortality are greatly reduced by abdominal delivery.

(3) **PREMATURE SEPARATION**—What has been said regarding placenta previa applies equally to premature separation. It is common knowledge, however, that accidental hemorrhage is almost invariably accompanied by toxemia. Toxemic patients, it is generally conceded, are poor surgical subjects. Hence it is well to keep in mind that, irrespective of the shock and blood loss resulting from placental ablation, the toxemia itself adds to the risk of surgical delivery.

Kerr and Holland report a series of 66 cases of premature separation. On 36 patients Cesarean section was performed, with a maternal mortality of 11 per cent. On 30 patients Cesa-

rean hysterectomy was performed, with a maternal mortality of 46.6 per cent.

If recognized early, all things considered, Cesarean section is looked upon as the preferential mode of delivery for this complication.

(4) **ELDERLY PRIMIGRAVIDÆ**—In recent years the indication for Cesarean section has been extended to include various forms of malpresentation, especially in elderly primigravidae. A breech presentation in a primigravida of 40 years or over will almost inevitably eventuate in a stillbirth and hence under such circumstances an elective Cesarean section affords the most certain means of obtaining a live child.

Meyer and Jaroschka advance the theory that the special difficulty encountered in elderly patients is due not so much to age, as to the inclusion in the older group of those who would have had difficulty at any age, and who marry late in life because of definite physical defects, or who conceive late because of hypoplasia of the genital organs.

M. Schulze (J. A. M. A. 93:824 (Sept. 14) 1929) has analyzed the labors of 337 primigravidae who were over 30 years of age. In this group there were 35 Cesarean deliveries, an incidence of 10.3 per cent. Of these patients, 18 would undoubtedly have been delivered abdominally regardless of age, while in the other 17, the age was an important complicating factor in the choice of procedure. This investigation also disclosed that abnormal presentation and contracted pelvis were both more frequent than in younger patients and increased the necessity for operative intervention.

The most important single factor

with respect to the prognosis is the quality of uterine contractions since it is known that the handicap of inadequate pains increases with advancing years. Unfortunately this feature cannot be foretold until labor is actually in progress.

It may be advisable, therefore, to observe the type of uterine contractions and then, if these seem insufficient to carry the patient through successfully, to perform Cesarean delivery.

In elderly primigravidæ, a rather high percentage of Cesarean deliveries will probably always be necessary, especially in those with a history of long standing sterility. Besides, the special desire for offspring in these patients renders it desirable to minimize fetal risk.

(5) **CONSTITUTIONAL DISEASE**—Probably the most common systemic disease calling for expeditious extraction is *heart disease* with threatening decompensation. In the face of cardiac disorder with impending failure, abdominal delivery, preferably under spinal or local anesthesia, appears to be a far safer method than normal vaginal delivery. A similar assertion may be made with reference to active *pulmonary disease*.

**CONTRAINDICATIONS** —(1) **ECLAMPSIA**—A study of the mortality figures following the conservative treatment of convulsive intoxication proves quite conclusively that abdominal section is rarely, if ever, indicated in this condition. Following Cesarean section, Bourne reports a maternal death rate of 32, and Welz of 42.7 per cent. Williams records a maternal mortality of 24 per cent. after section and only 10.5 per cent. following the conservative plan.

According to G. C. Mosher (Surg., Gynec. and Obst. 45:655 (Nov) 1927), the indication for Cesarean delivery in eclampsia is limited to a primigravida with a rigid cervix, who shows no improvement after 6 hours of conservative treatment.

Should the operation become absolutely necessary in eclampsia, spinal or local anesthesia, it is claimed, is especially indicated. Stander points out that all inhalation anesthetics cause toxic manifestations similar to those of the toxemia itself. Local anesthesia is preferential because pneumonia, one of the most frequent complications in eclampsia, can be almost entirely avoided by this method.

(2) **INFECTION**—With regard to the performance of the abdominal operation in patients long in labor and, therefore, potentially infected, delivery, if possible, should, in such instances be effected through the vaginal route. The mortality of Cesarean section is indubitably increased after rupture of the membranes, attempted forceps delivery, induction of labor, version, or vaginal examination. In the presence of frank infection, however, any form of abdominal delivery, unless accompanied by hysterectomy, becomes a dangerous procedure with an ever increasing mortality.

In a series of 8000 sections studied by Polak, Holland, Gordon and Beck, the mortality in clean cases operated upon before or shortly after labor had begun, with the membranes unruptured, was 3 per cent. After rupture of the membranes, the mortality rose to 6 per cent. Following previous vaginal manipulation the rate soared to 10 to 20 per cent, depending on the extent and type of interference.

The dangers attendant upon vaginal examination preceding Cesarean section are also exemplified in the analysis of C A Gordon (Am J Obst and Gynec 16 307 (Sept) 1928) of 1805 operations reported from 34 hospitals in Brooklyn, N Y The indications were Contracted pelvis, 934 cases, eclampsia and other toxemias, 210 cases, antepartum hemorrhage, 117 cases The effect of vaginal examination is seen in the table

Kerr and Holland report in another series of 220 operations, a death rate of 10 per cent in patients operated upon late in labor and in 107 cases, a mortality of 27 per cent, after rupture of the membranes or after attempts at forceps delivery

J W Harris and J H Brown (Am J. Obst and Gynec 16 332 (Sept) 1928), in a bacteriologic study of 50 uteri from which cultures were taken during Cesarean section, found

	Without Vaginal Examination		With Vaginal Examination	
	No Cases	Per Cent Mortality	No Cases	Per Cent Mortality
Classical	273	5 8	199	13 5
Low Cervical	66	1 5	57	10 5

The influence of the time of operation and the effects of vaginal manipulation upon maternal mortality are depicted in the appended table prepared from a collective investigation of Kerr and Holland of a series of 2014 sections, performed for contracted pelvis, antepartum hemorrhage, toxemia and other complications

that in 19 elective operations the contents of the uterus were uniformly sterile In 6 patients on whom the operation was done within 4 hours after the onset of labor there was likewise no contamination In 22 patients, however, on whom sections were performed, 6 or more hours after the onset of labor, bacteria were

Time of Operation	Total Cases	Maternal Deaths	Per Cent Mortality
1 Not in labor	1289	18	1 4
2 Early in labor	384	7	1 8
3 Late in labor	213	20	9 4
4 After induction of labor	35	5	14 0
5 After failure of forceps, etc	102	27	26 5

The fetal mortality in a series of 1920 sections is also portrayed in the following

demonstrated in the lower uterine segment These figures confirm the general belief that the operation

Time of Operation	Number of Children	Fetal Deaths	Per Cent Mortality
1 Not in labor	1208	10	0 8
2 Early in labor	393	4	1 0
3 Late in labor	219	25	11 4
4 After failure of forceps	100	27	27 0

should, whenever possible, be of the elective type

**TYPES OF OPERATION.—I CORPOREAL CESAREAN SECTION**—A review of the recent literature with reference to the "classical" section reveals no notable contribution to this operation. The discussion centers chiefly on the type of incision to be employed, the high, mid and low types of operation being favored by almost an equal number of advocates. The question of suture material and the number of layers of sutures are also discussed. Nearly all writers agree that the uterine endometrium is not to be included in the suture line.

Many accoucheurs have found the corporeal section unsatisfactory and favor the low cervical procedure. For the relatively inexperienced operator, however, the classical section still retains many advantages.

E B Piper and C Bachman (Surg, Gynec and Obst 49 547 (Oct) 1929) advocate the low uterine incision for the classical operation as originally recommended by Newell. They believe that the low incision confines contamination principally to the pelvis. Since the peritoneal coat of the fundus is loosely invested at this level, the application of a Lambert sero-serous stitch is rendered practicable. Although the latter stitch is time consuming, it is well worth while, they claim, even in emergency cases, because it favors a smoother convalescence and adds a factor of safety.

With respect to the low cervical operation, itself, the writers named have endeavored to maintain a neutral attitude. They believe, however, that there is no difference in the im-

mediate convalescence as regards the 2 types of procedure. After labor has begun, the cervical operation may provide some added safety and less febrile morbidity, though these advantages are not outstanding. A study of morbidity after section should include nausea, tympanites, anemia, wound complications, adhesions, effect on lactation and future childbirth. According to Piper and Bachman (*ibid*) these morbid symptoms are less frequent after the corporeal operation.

Potter reports 1500 classical operations with a mortality of only 2 per cent. He packs the uterus with a strip of 10 per cent iodoform gauze, but does not push this gauze through the cervix. The gauze, it is asserted, stimulates the uterus to contract and protects the basal endometrium. The pack is removed through the vagina on the second day.

Kennedy also favors the classical procedure, claiming the flap splitting operation exposes the retroperitoneal space which is rich in absorbents and has no protective elements such as the peritoneum itself possesses.

**II LOW SEGMENT CESAREAN SECTION (Kerr Transverse Incision)**—Munro Kerr, of Glasgow, has devised a technic which he terms the low segment operation. This operation occupies an intermediate position between the classical and low cervical procedures.

(a) *Technic*—A transverse incision is made in the peritoneal fold over the fetal head on a line just where the lower segment joins the body of the uterus. A similar incision over the muscular wall of the lower segment is curved upwards at both ends to afford more room and to avoid



tearing the circular sinus at the junction of the upper and lower segments "T" clamps are placed on the thin uterine muscle to control hemorrhage. The head may be delivered with the hand or with the aid of 1 blade of a forceps, placed anteriorly, just over the symphysis and used as a vectis, while pressure is made over the uterine fundus at the same time.

If the cervix is dilated, the placenta is expressed through the vagina to avoid the risk of infection. After delivery, the uterine muscle is closed with 3 or 4 stay sutures and a tier of continuous sutures. After the upper serous flap is anchored, a continuous overlapping of the lower serous flap follows. As the bladder is not separated, the cervical portion of the uterus is not reached.

(b) *Advantages*—Kerr and Hendry record 107 patients upon whom this operation was performed. Among 82 "clean" cases there were no deaths. In 25 "doubtful" cases the mortality was 16 per cent, making a total maternal mortality of 4 per cent. They believe the operation affords easier extraction of the head, leaves a better scar and diminishes the possibility of rupture of the uterus in subsequent pregnancy or labor.

A special indication for the transverse incision, it is said, is found in patients suffering with uretero-pyelocystitis, or in those in whom separation of the bladder is attended with special risk. It is not a desirable procedure in over obese individuals.

(c) *Limitations*—Objections to the transverse incision are offered by J. B. De Lee, L. E. Nadelhoffer and J. P. Greenhill (Am. J. Obst. and Gynec. 16:784 (Dec.) 1928) on the ground that it is attended by more

hemorrhage, that thrombosis and embolism are invited, and that it predisposes to abdominal hernia. If infection occurs, exudate is high up, rather than low down near the external os. It is difficult to build an accurate suture line, as the upper end of the lower segment may retract into the body of the uterus. Moreover, a prolapse through the wound of a shoulder or an arm may occur unless the transverse incision is kept low enough to lie over the prominence of the fetal head.

L. E. Phaneuff has modified the incision so as to render the operation low cervical in location. He separates the bladder fully from the cervix down to the vagina. The transverse incision is placed entirely in the cervix at a low level. After delivery the bladder is reattached to its original site, thus making the incision entirely retrovesical or subperitoneal. Phaneuff reports 36 operations with a maternal mortality of 28 per cent.

**III CERVICAL CESAREAN SECTION**—Three types of cervical Cesarean section have been described.

(1) The extraperitoneal operation of Kustner and Latzko.

(2) The transperitoneal section of Veit-Fromme-Hirst, modified recently by Brodhead, Langrock and Cassasa and known as the peritoneal exclusion operation.

(3) The intraperitoneal, retrovesical, or subperitoneal operation of Kroenig, modified by Beck and De Lee.

*Extraperitoneal Operation*—A lateral oblique pelvic incision is made and the peritoneum is dissected from the anterior aspect of the inlet, the bladder and the lower uterine segment. The cervix is freed and the baby is delivered through a longi-

tudinal extraperitoneal uterine incision.

It is a true extraperitoneal operation. This method of approach in experienced hands avoids the dangers consequent upon opening the peritoneal cavity. It is known, however, that virulent bacteria may penetrate even an intact peritoneum.

The operation is technically difficult. Moreover, the peritoneum is often opened unintentionally, thus nullifying all its supposed advantages. Injuries to the bladder and ureters are not uncommon. Due to infection, with suppuration of the cellular tissue, prolonged drainage is sometimes required. Furthermore, adhesions prevent repetition of this site of approach. Owing to the disadvantages enumerated, the operation is now rarely employed.

*Peritoneal Exclusion or Transperitoneal Operation*—This operation was adopted to overcome the difficulties attendant upon the true extraperitoneal approach. A median longitudinal abdomino-pelvic incision is made and the vesico-uterine peritoneum is incised longitudinally. The bladder is separated from the cervix and 2 lateral flaps of visceral peritoneum are dissected. These are united to the parietal peritoneum by interrupted catgut before the uterine musculature is incised. This affords a so-called extraperitoneal space through which an incision is made in the lower cervical part of the uterus and the baby is delivered. The cervical incision is closed and the peritoneal flaps are approximated by a continuous tier of catgut.

The peritoneal edges become firmly united and the cervical incision is extraperitoneal during convalescence.

The operation has several limitations. The peritoneum is occasionally so thin that it may not be easily separated from the uterus. A band of scar tissue, moreover, may fix the cervix at a higher point than normal in the pelvis.

*Retrovesical, Subperitoneal Operation (Laparotrachelotomy, Kronig, Beck, De Lee)*—This operation is favored by a growing number of experienced obstetricians. Numerous reports have appeared in the literature testifying to the superiority of the low cervical section over classic operation.

(a) *Technic*—The operation may be performed under general, spinal or local anesthesia. **Spinal anesthesia** is of value especially in toxemia, because it does not add hepatic or renal irritation. It is by no means as safe, however, as local infiltration anesthesia.

J. B. De Lee, L. E. Nadelhoffer and J. P. Greenhill (*loc cit*) point out the feasibility and advantages of performing the operation under **local infiltration anesthesia**. They believe the mortality of the low cervical section can be further lowered by this form of anesthesia, as the dangers of acidosis, pneumonia, lung, heart, kidney and liver damage are minimized.

No morphine is given prior to operation because of possible fetal asphyxia. A 0.5 per cent of procaine hydrochloride solution is used, to which, after sterilization, 2 drops of a 1:1000 solution of epinephrin are added for each ounce (30 c.c.). The average amount of anesthetic used is less than 6 ounces (180 c.c.).

Beginning at the upper end of the proposed incision, the procaine hydrochloride is injected into the skin in the midline all the way down to a

point just above the symphysis pubis. After a delay of 5 minutes, an incision is made through the skin and fat. Then the fascia, rectus muscles and parietal peritoneum are successively desensitized. The peritoneal cavity is then opened. Following this a special point of infiltration is made about the symphysis and under the loose peritoneum between the bladder and the lower uterine segment. With the finger the anesthetic is spread beneath the bladder and well out into the broad ligaments.

The uterus itself is not desensitized unless the patient is in active labor. During the delivery of the child, however, some patients require a mild gas anesthesia.

In this operation the bladder peritoneum is incised transversely and stripped down as far as necessary. A longitudinal incision is then made in the thin, non-contractile lower uterine segment.

The baby is extracted manually or with forceps, the placenta is removed and the uterus is closed.

Beck and De Lee have modified the operation by raising an upper as well as a lower flap of peritoneum. In closure they suture the upper peritoneal flap to the lower segment, thus covering the upper part of the cervical incision, and then suture the lower flap so as to override the upper flap. They contend that this offers more definite protection of the peritoneal cavity should infection occur in the uterus.

(b) *Advantages*—Some of the advantages claimed are

1. A minimum degree of shock
2. Adhesions are less frequent
3. The danger of infection is markedly reduced

4. Rupture of the scar is unlikely, because the incision is in the resting non-involuting part of the uterus and because this area plays a late and passive rôle in the stretching which occurs in pregnancy and labor.

According to J. P. Greenhill and B. Bloom (J. A. M. A. 92:21 (Jan 5) 1929), there were reported in the literature of the world up to 1929, only 12 authentic cases of rupture of the uterus in a compilation of more than 25,000 low cervical operations.

All the ruptures occurred in patients who had been in labor a long time. No rupture, it is claimed, occurred during pregnancy.

The muscular regeneration is not complete, but a good firm scar is developed which is resistant to the dilatation of pregnancy and the forces of labor.

In 37 patients on whom a low cervical section had been performed, pieces of tissue were removed from the site of incision by J. P. Greenhill at a second operation. In 5 patients the scar was so thin as to suggest that the uterus could not withstand the test of labor. In 26 patients the cicatrix was insignificant and in 6 others there was no scar at all. Weak scars may arise, it is stated, if the incision is unduly prolonged beyond the cervix.

J. B. De Lee, L. E. Nadelhoffer and J. P. Greenhill (*loc cit*) report 718 low cervical operations with 9 maternal deaths, a mortality of 1.2 per cent. In this group, 82 operations were performed a second, 8 a third, and 1 a fourth time. In the repeated laparotrachelotomies, there was a maternal mortality of 2.2 per cent.

J. B. De Lee, L. E. Nadelhoffer and J. P. Greenhill (*ibid*) claim that

laparotrachelotomy is vastly superior to the old classic operation and that it is well situated, should bacterial invasion already be present. Infection may be drained by inserting an iodoform gauze wick over the lower segment and then suturing the edge of the bladder peritoneum to the uterus, thus covering the lower segment and wick. The abdomen is closed, and the wick is withdrawn through a small incision in the anterior vaginal wall.

If a patient with a low cervical section becomes infected later, one may establish drainage by passing a finger through the cervical canal into the area involved.

(c) *Limitations*—The low cervical operation is said to be most readily performed after the onset of labor, when the lower uterine segment has become extended and thinned out. According to E. B. Piper and C. Bachman (*loc cit*), however, this is true only if the membranes are intact and there is no excessive molding of the head. Otherwise the fetal head is deeply placed behind an over-stretched bladder and pressed tightly against the pelvic brim.

If the operation is performed before the onset of labor, the lower segment is often thick, and troublesome hemorrhage may be encountered.

It is also claimed that the operation is unsuited in placenta previa, though De Lee has performed the operation successfully in several cases of this type. It is further stated that the low procedure is somewhat difficult in patients with the uterus anchored to the anterior abdominal wall, owing to the presence of adhesions.

Potter maintains that the low "two

flap" operation is not easy to do. Many operators have worked from 1 to 1½ hours to control hemorrhage alone and it is needless to say that women potentially infected should not be exposed to prolonged surgical work.

**IV. HYSTERECTOMY WITH CESAREAN**—In 1928 J. P. Greenhill (J. A. M. A. 90:1023 (Mar. 31) 1928) reported 4 cases of supravaginal hysterectomy after Cesarean section, under local anesthesia. In many respects, his technic is similar to that described under the low cervical operation.

The vesico-uterine peritoneum is incised transversely and the bladder is stripped downwards a slight distance only. A transverse instead of a vertical incision is made in the lower uterine segment near its junction with the body of the uterus. This incision is preferable, because it avoids the necessity of widely stripping the bladder from the lower uterine segment. The hysterectomy can then be performed by simply continuing the transverse incision posteriorly.

Briefly, the indications for hysterectomy following Cesarean section are

- 1 Mismanaged labor with infection
- 2 Uterine apoplexy
- 3 Uterine myomata
- 4 Uncontrollable hemorrhage
- 5 Carcinoma of the cervix

In the face of the latter, obviously, the hysterectomy must be complete.

**V. TEMPORARY EXTERIORIZATION OF UTERUS (Gottschalk-Portes Operation)**—This operation was first performed by Gottschalk, of Berlin, in 1909. It was again brought to the fore by Louis Portes in 1923.

It is performed in 2 stages as follows (1) A median longitudinal incision is made, and the pregnant uterus is delivered, (2) the abdominal incision above and below the uterus is sutured, (3) a high uterine incision is then made and the baby is delivered, (4) the incision in the uterus is then closed by 3 layers of sutures, (5) the uterine body is covered with sterile dressings and allowed to rest on the abdominal wall

If the patient makes a good convalescence, involution is awaited, following which the abdomen is reopened and the uterus, with its adnexæ, are replaced within the abdominal cavity. Drainage is established by carrying gauze or tubing through the incision into the pouch of Douglas

If, however, sepsis appears uncontrollable, an extra-abdominal hysterectomy, after the primary shock subsides, is performed

Figures collected by Couvelaire show 32 operations of this type with only 2 deaths, a mortality of 6.2 per cent. In every case in which the uterus was replaced the patient recovered

This operation has a place, it is claimed, in the hopelessly neglected and frankly infected case, when the uterus, tubes and ovaries are to be preserved. The obstetrical future of the patient may possibly, therefore, remain uninterrupted

**VI VAGINAL CESAREAN SECTION.**—The original operation called for a median anterior incision through the cervix, but later a posterior incision was added, reducing, thereby, the danger of injury of the bladder

The indications for the operation are

1. A heart, lung or kidney lesion.
2. Early or late toxemia
3. A mild premature separation of the placenta

It should not be attempted after the thirty-sixth week of gestation. Even if performed earlier, it is not free from technical difficulties

Phaneuff reports 27 cases of vaginal Cesarean. Anterior cervical incisions were made in 12 patients and anterior and posterior incisions in 15. The advantages claimed for the procedure are. The operation is extra-peritoneal, post-operative complications are few, and the dangers of infection minimized

**CONCLUSION**—Finally, one may say that the operation of Cesarean section must not be regarded as a panacea for all obstetric ills. Too many, far too many, operations have been, and are still being done. A tremendous number are performed on the most flimsy excuse, or scarcely any excuse at all, the operator failing to recall that no major obstetric procedure is fraught with more potential danger, and that no other carries a higher primary mortality

In no department of medicine is a renaissance more devoutly to be wished but it will never come in the form of ill-timed or unrestrained surgical enthusiasm

**CHEMOTHERAPY.**—According to J. A. Kolmer (Transactions Phila. Co. Med. Soc., Weekly Roster and Med. Digest (Oct. 13) 1928), the underlying principle of chemotherapy is the production in the laboratory of synthetic chemical agents which can be administered to sick humans in dosages toxic to a parasite infecting the organism but not toxic to the

body The effect on the parasite is called "*parasitropism*", that on the body, "*organotropism*" The aim is to produce compounds having the maximum parasitropism with the minimum organotropism This is the point of view of the immunologist However, in its present tendency of development, it is too narrow for medicine, for it fails to include the concept underlying the treatment of malignancy with lead and other chemically prepared synthetic compounds Chemotherapy, then, may well be defined as the treatment of disease with synthetic chemical agents designed to specifically combat the progress of the pathological process whether or not this be due to invasive microorganisms

In the *Klinische Wochenschrift* 7 1497 (Aug 5) 1928, Seiffert gives an extended review and discussion of the facts obtained by experimentation relative to the mechanisms involved in chemotherapy He concludes that the host is an active participant in the reactions There seems to be little doubt that the phenomenon of drug fastness (or specificity?) is dependent upon the chemical structure of the agent used This of course is logical and augers well for future development, which, however, will depend on increasing knowledge of the constitution of living protoplasm Present research interest is largely being directed along 3 main channels the chemotherapy of syphilis, the chemotherapy of general infections, and the chemotherapy of malignancy.

Interest in the arsenicals still holds the foreground, though bismuth preparations are increasingly having trial Though it is too early to give con-

clusions, the reports indicate the frequent utility of *bismuth* in syphilis The mode of action of these metallic compounds is yet unsolved It has been shown that the simultaneous administration of arsenicals and sulfhydryl compounds inhibits the effectiveness of the metal action It may be that here is a key for unlocking what has been hitherto a closed room In more generalized infections, apart from the specific syphilitic, *Pregl's iodine* in infections of the puerperium is at times immediately and brilliantly successful when all other means have failed It is claimed by some that this chemotherapeutic agent has almost specific relations to the streptococcus hemolyticus

*Mercurochrome*, for which much was first claimed in intravenous therapy, is not continuing in favor Whether this is due to inadequacy in administration or in the drug has yet to be established For infections of the genito-urinary tract, *hexyl resorcinol* has developed some prestige with apparent justification The whole matter of chemotherapy with dyes, etc., is still in the experimental stage and will continue to be so for some years to come The only rational course for the practitioner is to try only those chemotherapeutic agents which have been developed in laboratories and by workers of recognized scientific integrity and attainment The chemotherapy of malignancy has centered chiefly around the use of colloidal preparations of lead, selenium, and tellurium This phase of the subject can best be considered under the heading of Colloidal Therapy Extensive studies with coal tar derivatives have yielded no hopeful results.

**CHEST INJURIES.**—According to R B Bettman (Am J Surg 6 449 (Apr) 1929), the presence or absence of a *pneumothorax*, following a chest injury, is of such importance in the treatment of a case that any study of thoracic injuries must naturally be divided into the cases with a pneumothorax and cases without a pneumothorax. He emphasizes that all sucking wounds of the chest should be immediately closed.

In a case of closed pneumothorax with severe dyspnea, air may be aspirated from the pleural sac. This should be done only if absolutely necessary, because expanding the injured lung may result in an increase in bleeding and in the development of still another type of pneumothorax termed an internal open pneumothorax. In this type of pneumothorax, collapse of both lungs may occur from positive pressure due to air being sucked into the pleural space during inspiration. In the presence of marked dyspnea following a chest injury, the intra-pleural pressure should be determined by means of a manometer. If a positive pressure pneumothorax exists, provision should be made for the escape of the pleural air.

*Hemorrhage* from the intercostal arteries is best controlled by encircling the entire rib with a heavy suture. Large lacerations of the lungs should be repaired.

Since the thoracic cavity is as easily explored as the abdominal cavity, exploration should be done when indicated.

**INTRA-THORACIC ACCIDENTS**—L Kessel and H T Hyman (Am J M Sc 175 511 (Apr) 1928) noted the following accidents

*A Acute spontaneous pneumothorax* occurred on 4 occasions in otherwise healthy individuals. In 2 instances, pneumothorax occurred following strain, the third case occurred during the course of a grippe infection, the fourth case in a patient operated upon for gangrenous appendicitis. All of these cases cleared up promptly and showed no evidence of tuberculosis.

*B Traumatic effusion*, non-hemorrhagic in type, occurred in a man, aged 35 years, who received a blow on his chest. He made a complete recovery following aspiration and showed no evidence of neoplasm or pulmonary disease.

*C Collapse of the lung* following trauma. A massive collapse of the left lung occurred 10 days after simple fracture of the lower ribs on the right side. Ten days later the chest had cleared.

**RUPTURE OF THE THORACIC DUCT**—E D Smith (Kentucky M J 26 198 (Apr) 1928) reports a case of rupture of the thoracic duct caused by an operation for the removal of diseased cervical glands on the left side. The patient complained of an enormous cystic swelling distending the entire left side of his neck and of progressive loss of weight and strength.

An incision into this area disclosed a chylous coagulum and the round opening of the thoracic duct. A free jet-like discharge of lymph occurred from the duct. Ligation of the duct here was impossible due to induration. Contiguous structures were sewed over the duct, and the wound was closed. A small puncture wound at the upper edge of the clavicle was made and a narrow strip of gutta percha stitched in place to provide a tunnel for leakage.

At first there was a great loss of chyle, but later the flow ceased, the fistula closed, and the patient regained weight and strength

The author concludes that a wound in the thoracic duct should not be permitted to drain into the tissues of the neck with the expectation that spontaneous closure will occur. When the wound is in the long axis of the duct, the ideal treatment consists in suture with implantation of the end of the severed duct into a vein.

Paire's (Bull et mém Soc nat de chir 55 813 (June 15) 1929) report concerns the victim of a motor car accident. Examination disclosed a fracture of the sixth rib and of the right hip. *Chylothorax* developed on the left side. A strict diet free from all fats and milk was prescribed. A loss of 8 Kg (17 pounds) was registered within the first 10 days. The loss of weight was regained in the following weeks and the patient recovered completely without showing signs of internal injury except for the fractures.

### CHOLANGITIS AND CHOLECYSTITIS — ETIOLOGY.

Definite acute and chronic cholecystitis was experimentally produced in a series of dogs by J. Brams and L. Darnbacher (Radiology 13 103 (Aug) 1929) using dosages of x-rays that are within the range of those used for therapeutic purposes. The changes were destructive, consisting of hemorrhage, edema, round cell infiltration, fibrous tissue hyperplasia, and in some instances necrosis of the epithelium resembling chemical cholecystitis. Due to the relative lack of injury of the exposed portion of the duodenal and pyloric mucosa, it ap-

pears that the gall-bladder epithelium is more sensitive to the x-rays, suggesting the possibility of its injury by deep therapy in this region.

W. Martin (Ann Surg 90 47 (July) 1929) examined small pieces of liver excised near the gall-bladder bed during operation, in 27 cases of well marked cholecystitis and cholelithiasis, without obstruction of the common duct and within a few days after an acute attack. He used 2 methods of culture. In one the fragment of liver was allowed to autolyze in the presence of moisture and the other was dropped into a tube containing Rosenow's medium. After 24 hours' incubation smears were obtained and aerobic and anaerobic cultures were made on blood agar, Huntton's medium and dextrin broth. These examinations were repeated in 48 and 72 hours. In only 6 cases were bacteria found, 3 of these were few in number and difficult to grow as if of low vitality. Two of these smears showed Gram-positive cocci, probably enterococci. Two yielded Gram-negative bacilli of the colon group. Of the 3 successful cultures, 1 showed a Gram-positive *diphtheroid bacillus*, another *staphylococci* and the third *colon bacilli*.

**PATHOLOGY**—Of 41 cases of cholecystitis and cholelithiasis, H. Akaiwa and D. M. Sugano (Ann Surg 90 415 (Sept) 1929) found hypoacidity in 31. This was more marked with stone in the common duct. Following operation there was no appreciable change. They believe the hypoacidity precedes the occurrence of gall-stones and so favors the ascent of bacteria up the intestinal canal, thus giving opportunity for biliary tract infection. The associated



fever, vomiting, etc., caused further hypoacidity by their effect on the gastric secretion leading to chronic anacid gastritis. The measurement of gastric acidity in these conditions is important in diagnosis and in gauging the extent of the disease.

In the opinion of J. B. Deaver and V. G. Burden (*S. Clin. North America* 9:1020 (Oct.) 1929), cholangitis is a clinical and pathologic entity presenting a diffuse infection of the biliary tract in which the bile channels are characteristically involved. Its seriousness depends upon the extent of infection, the consequent derangement of the liver function and the harmful and often permanent sequels.

Histologically there is round cell infiltration, edema, and cystic changes of the ramified mucous glands in the walls of the ducts, thus deeply entrenching the infection. It is most frequently associated with cholecystitis, lymphangitis and lymphadenitis of adjacent territory, often involvement of the head of the pancreas with swelling and softness, enlargement and congestion of the liver with inflammatory changes around the smaller bile ducts with edema and cloudy swelling of parenchymal cells (usually confined to right lobe). It may occur with infectious fevers as influenza, pneumonia, typhoid, gastroenteritis (infectious or toxic). The primary type is infectious.

Cholecystitis is classed by S. R. Roberts (*Illinois M. J.* 56:317 (Nov.) 1929) as a cause for cardiac abnormalities such as first degree heart failure, angina pectoris, etc. He refers to 13 cases of this nature reported by Babcock in 1909, and the 61 cases Willus reported, in 54 per

cent of which there was definite improvement in the cardiovascular condition following operation.

Lichty and others have contributed evidence that a diseased gall-bladder is a probable focus of infection and a focus of reflex disturbances.

The similarity of pain due to gall-bladder disease is at times interpreted as angina pectoris, or both conditions may be present with distinct symptoms of each. Such patients, provided they be in fair condition and well prepared, apparently stand operation better than their clinical condition might indicate. Graham has said "we have observed brilliant results in heart disease following cholecystectomy after it had been determined that there was a pathological gall-bladder."

**TREATMENT**—Unless there is spontaneous improvement, early drainage is strongly advocated by J. B. Deaver and V. G. Burden (*loc. cit.*) for cholangitis, to avoid permanent liver damage, stenosis of the common duct and other serious sequels. Only the minimum amount of operative procedure which will establish drainage is recommended.

In 13 cases fed mercurochrome by mouth to the point of salivation, L. Martin and J. H. Hill (*Amer. J. M. Sc.* 177:710 (May) 1929) were able to find no bactericidal effect and no visible trace of the dye in the bile. In 8 persons with cholecystitis this treatment had no effect upon the symptoms. However, following the intravenous injection of 20 c.c. of 1 per cent mercurochrome the dye could be demonstrated in bile siphoned out through a duodenal tube, in from 18 to 23 minutes and again in from 18 to 20 hours. This bile was bacteri-

cidal and contained mercurochrome. Apparently this dye may be stored in the gall-bladder. Of 8 cases of cholecystitis in which mercurochrome was given intravenously, a clinical cure was obtained and the bile rendered sterile in 5, no improvement was noted in 3. The gall-bladders of dogs were found to contain mercurochrome 18 hours after its intravenous injection. It may thus be used as a cholecystographic material. Before intravenous injection of this drug the patient should be informed that reactions usually occur, varying from a mild diarrhea or nausea to a marked chill with fever, vomiting and diarrhea.

**CHOLELITHIASIS** — Waegner (Med Klinik 25 1611, 1929) reports a case of definite demonstration of gall-stones in the cholecystogram of a patient with severe parenchymal injuries to the liver. Contrary to the advice of many, he concludes that, despite the functional nature of this test, it should be attempted even in icterus.

**TREATMENT** — Lorand (Med Klin 25 1587, 1929) advocates the application of hot radio-active mud packs and irradiation with the quartz lamp in the treatment of gall-stones.

**CHOLESTEROSIS.—PATHOLOGY** — C F W Illingworth (Brit J Surg 17 203 (Oct) 1929) describes *cholesterosis*—strawberry change and cholesterol polyposis. It consists essentially of an infiltration of the epithelium and stroma of the mucous membrane of the gall-bladder with lipoids, especially cholesterol. A characteristic feature in the stroma is the presence of large "foamy" cells of endothelial origin.

It is usually associated with cholecystitis, often of mild degree. Gall-stones, especially cholesterol, are usually present. Cholecystography indicates that the 2 functions of concentration and emptying in response to fats are not affected in uncomplicated cases. Blood cholesterol is at times increased but is often normal. The symptoms are those of chronic cholecystitis. **Cholecystectomy** seems to be the rational treatment and yielded satisfactory results in 6 uncomplicated cases.

Illingworth (*ibid*) found that (a) cholesterosis was most readily produced in rabbits by prolonged hypercholesterolemia in the presence of mild chronic bacterial cholecystitis, and (b) did not result simply from deposit of an excess of cholesterol from the blood, but was intimately linked with gall-bladder function with regard to cholesterol. He concludes, therefore, that cholesterosis results from (a) an increase of cholesterol in the bile, and (b) a change in the physical and chemical state of the absorbed but invisible cholesterol which renders it optically active and recognizable and, preventing its transport, leads to its accumulation in the gall-bladder wall. This change is most frequently due to an inflammation of the gall-bladder.

**CHOLESTEROL-CHOLESTERINEMIA.**—The literature indicates persistently that cholesterol is important in *immunity* although the details are not clear. H Gougerot (Paris méd 1 64 (Jan 21) 1928) describes a case in which tuberculides appeared in a young man following an attack of *tuberculous pleurisy*. The eruption persisted with no change for about

10 months until xanthomatous deposits began to infiltrate the tuberculides, whereupon the latter slowly disappeared. Five years later, both conditions disappeared and only fine cicatricial atrophy remained.

Kameda (Japan Gesell f inn Med Apr 1, 1929), in experimental *staphylococcus*, *streptococcus* and *colon bacillus* infections and vaccinations in rabbits, found definite decrease in the blood cholesterol when the infection ceased.

Other work can be cited but definite workable knowledge seems far away. If it is desired to produce a hypercholesterinemia, suitable diets can be prescribed. Probably the sole source of cholesterol is the food, although certain experiments as suggested by Chamberlain seem to indicate that it may be synthesized at times. Mere hypercholesterinemia, however, is not sufficient to produce *xanthelasmas* so common in *diabetes* and certain *liver conditions*. F D Weidman (Arch Dermat and Syph 15: 659 (June) 1927) states that some factor in addition to the presence of high blood cholesterol and young connective tissue cells is necessary to the development of *xanthoma tuberosum*. Probably there is a definite metabolic disturbance of lipid metabolism as an entity. More work is necessary to elucidate this problem and to supply a key to co-ordination in lipid changes in the variety of conditions in which it is found, such as *splenomegaly* and *enlarged liver*, certain cases of *diabetes*, *nephrosis*, etc.

**CHOLESTEROL METABOLISM IN HEALTH AND IN ANEMIA.**—G L Muller (Medicine 9: 119 (May) 1930) summarizes our knowledge of cholesterol metabolism

in health and the anemias which has been accumulating up to the present time. He shows that inconstant and variable results have been obtained with reference to cholesterol in the food and cholesterol in the body. The general opinion appears to be that in herbivorous animals, the cholesterol level can be altered in the blood by altering the cholesterol in the diet, but in omnivorous and carnivorous animals, there appears to exist an efficient regulatory apparatus within the body and whatever influence is brought about, either an increase or decrease is but temporary. Therefore, in man cholesterol by mouth plays but a small part in the endogenous cholesterol metabolism, and any alteration of the cholesterol blood level is not to be looked upon as a decrease or increase of the amount of cholesterol, but as an abnormality of the regulation. G L Muller points out that the reticulo-endothelial system plays an important rôle in cholesterol metabolism, thus revealing the relation to some extent of the variations of cholesterol in the blood found in diseases involving the blood and the blood-producing organs. It is certain that the body can synthesize cholesterol probably from a fatty acid, although these building stones have not been positively determined up to the present time. Destruction of blood cholesterol appears unlikely from evidence at hand. Changes in the amount of cholesterol found in the blood and tissues have been noted in practically all kinds of endocrine disturbances and the relation between cholesterol metabolism and the various internal secretions remains one of the major metabolic problems of the present day.

Cholesterol is found decreased in many cases of anemias and more especially in the so-called hemolytic anemia. A decrease in the number of red blood cells found in the peripheral circulating blood may explain in part the low value of the blood cholesterol sometimes seen in anemia. On the other hand, in severe primary anemia and in anemia due to marked hemorrhage, a condition of hypercholesteremia may be present. Muller points out that in pernicious anemia blood cholesterol is directly related to the relapse and remission occurring in this disease, and the cholesterol elevation at the onset of the remission is produced by the active principle effective in primary anemia. The manner in which this principle acts on the cholesterol metabolism is at present unknown since no information exists as to what happens to the balance of cholesterol and this phase of the affection. By way of speculation, Muller shows that low cholesterol values are obtained by increasing the functional activities of the reticulo-endothelial system. An increase of this activity would explain the low values of cholesterol in the blood in the hemolytic anemias in which the increased blood destruction and mild pigment formation indicate an increase in the activity of the reticulo-endothelial system. Muller sees some relationship in pernicious anemia between the blood destruction and bilirubinemia decrease at the onset of the remission, whereas cholesterol increases. The decrease in the activity of the reticulo-endothelial system would explain all of these phenomena.

Investigating one phase of cholesterol metabolism, Muller, working

with pigeons, found an increase of blood cholesterol closely associated with a decrease of the hematopoietic function, that is, a decrease of the functional activity of the reticulo-endothelial system of the entire body. Muller further points out that by correlating the activity of the reticulo-endothelial system and the level of the blood cholesterol, a fact which hitherto has appeared obscure may perhaps be understood now, *viz.*, that the hypercholesterinemia associated in many conditions with acidosis may be adequately interpreted as a decrease of the functional activities and permeability of cells. Hueck, quoted by Muller, emphasizes the importance of acid-base and points out that the same organs which regulate the acid-base equilibrium of the body also regulate the cholesterol metabolism. Recent experimental work has yielded much information which points to a close association between cholesterol retention in the body and acidosis. Substances which decrease oxidation and, also, administration of acid, will produce an increase of blood cholesterol with deposits in the tissues, this does not, of necessity indicate a change in the acid-base balance in the body but of the tissues themselves, which normally may have an acid-base equilibrium different than that of the body as a whole. Many diseases which are accompanied by marked acidosis likewise reveal retention of cholesterol. Muller believes that the interference with the acid-base balance in the body may also explain the facility with which the cholesterol level may be altered in herbivorous animals. In these animals the maintenance of the normal acid-base balance is not so efficient as

found in omnivorous and carnivorous animals.

The increase or decrease of blood cholesterol is probably connected with other physical chemical phenomena occurring in the body, as for example, in hemorrhagic anemias and nephrosis the hypercholesterinemia has been interpreted on the lack of blood protein and the influx of cholesterol and other fatty substances for the purpose of maintaining the osmotic tension

Currie, quoted by Muller, examined a series of normal individuals and found that cholesterol values for the blood reading were lowered from November to January, being higher in the summer months of the year Currie interpreted this as an indication that a seasonal variation in the normal readings occur A further important observation is that of a fall in the blood cholesterol due to its utilization on the part of actively growing cells In summarizing his excellent article, Muller states that further investigations of cholesterol metabolism should be directed toward a correlation of the blood cholesterol level to the functional state of the reticulo-endothelial system in various diseases, the relation of blood cholesterol to the growth of cells and to the concentration of serum proteins, as well as the influence of the physiochemical status of the medium and the colloidal state of the blood cholesterol

**CHOREA.—ETIOLOGY**—A B Vastine, DDS (Atlantic M J 31 564 (May) 1928) believed that some forms of chorea were the result of direct mechanical stimulation of the nervous mechanism supplying the teeth and their supporting structures

E Fanton (Clin Pediat 10.76 (Feb) 1928) found guanidine bases in the urine of 7 children with chorea, as well as small traces in the urine of children suffering from other conditions such as convulsions of toxic origin, tetany, and the like These observations, he believed, indicated that in children with chorea (and, in general, wherever there is a deficient parathyroid secretion) there was a modification of metabolism which caused the formation of intermediary products from the decomposition of protein substances

In 1927, J. C. Small (Am J M. Sc 173 101 (Jan) 1927, J Lab and Clin Med 14 1144 (Sept) 1929) described a non-hemolytic streptococcus which he obtained originally from a blood culture, and later with great regularity from the pharynx, in cases of rheumatic fever and chorea This micro-organism, which was named *Streptococcus cardio-arthritis*, was regarded by Small as a new species on the basis of its distinctive cultural and immunologic characteristics Its immune bodies (agglutinins and opsonins) were readily demonstrated in the serums of patients with rheumatic fever Experimentally, in certain animals, the micro-organisms would produce tissue reactions and lesions which apparently could not be distinguished from those of rheumatic fever (W P Belh, F Jodzis, E and E Fendrick, Arch Path 6 812 (Nov) 1928)

**PATHOLOGY**—An extensive histologic and bacteriologic study of the cerebral lesion found at the necropsy of a patient, aged 15 years, who had manifested choreiform movements, was made by J Lhermitte and P Pagniez (Bull et mém Soc med d

h<sup>ô</sup>p de Paris 53.945 (July 8) 1929) Two types of chorea are recognized the one, based on encephalitis caused by the virus of epidemic encephalitis or other pathologic virus, and the other caused by degeneration of the brain substance, as in the patient studied by the investigators mentioned above In this instance, inoculation of various animals with emulsions of the brain substance gave negative results

In the case of a patient having symptoms of right hemichorea related by A Weil (Brain, 51 36 (Mar) 1928), a cyst formation was found in the oral part of the left striate body, combined with hemiatrophy of the whole left striatum, the left globus pallidus and the left body of Luys There was also discovered sclerosis of ganglion cells in the lateral nucleus of the left thalamus

Chorea is a "release phenomenon" It arises from the excessive or irregular activity of intact structures from which a controlling influence has been withdrawn The impulses which produce choreic movements arise at a lower level than the body of Luys The controlling influence over these impulses is normally exerted by the body of Luys itself This is the opinion of J P Martin, (Lancet 2 315 (Aug 18) 1928) who asserted that there was no valid evidence that focal injuries above the body of Luys resulted in chorea From experimental evidence it has been shown that focal lesions of the caudate and lenticular nuclei do not give rise to chorea

The tonsils which were removed from 5 typical cases of chorea as well as from 18 cases of rheumatic fever, were studied microscopically by W.

W. Maclachlan and W G Richey (Ann Int Med 1 506 (Jan) 1928) The distinctive lesion encountered in this study was a proliferation of the endothelial cells lining the smaller vascular channels and the perivascular spaces Many of these cells assumed multi-nucleated forms The authors were not prepared to postulate that this is a reaction specific for rheumatic fever and chorea

#### Choreic Posture of the Hands —

The posture of the outstretched hands often seen in patients suffering from chorea is one of the most familiar of abnormal attitudes It is characterized by flexion at the wrist and hyperextension at the metacarpophalangeal joints The fingers are either straight or slightly flexed at the interphalangeal joints, and separated W R Brain (Lancet 1 439 (Mar 3) 1928) affirmed that this posture is a normal synergic muscular relationship, differing from the normal posture only in being exaggerated This exaggeration is the result of the hypotonia of the antagonistic muscles, which in turn is a local manifestation of the general hypotonia occurring in chorea Since the same posture may occur in other states associated with hypotonia, the term "choreic posture" is misleading and the phenomenon would better be described as "the hypotonic posture" of the hand

**Supporting Reaction (Stutzreaktion) in Chorea**—S Parker and E Stengel (Ztschr f d ges Neurol u Psychiat 112 747 (Feb 26) 1928) have found the "supporting reaction," first described by Magnus, to be of diagnostic value in chorea The sign is considered positive when pressure on the ball of the foot causes a fixa-

tion of the whole extremity in extension

**TREATMENT — Arsenic.** — The value of arsenic in the treatment of chorea still remains a much debated subject S Graham (Arch Dis Childhood 3 206 (Aug) 1928) thought that any improvement shown should be attributed to the tonic effect of the drug The intravenous administration of arsenic had no advantage over other methods

**Methenamine** — F deCapua (Pediatrics 37 623 (June 15) 1929) treated 12 children ranging in age from 7 to 12 years, with methenamine Some of the children also had rheumatic symptoms A 5 to 10 per cent solution of methenamine was employed Beginning with 2 c c (32 minims) the dosage was gradually increased to a maximum of 8 c c (2 drams) The medication was given intravenously every other day While the treatment has a favorable effect on motor disturbances and also on rheumatic symptoms, these were not constant

**Nirvanol** — In Germany, a fairly extensive trial has been given the use of nirvanol in the treatment of chorea B Leichtentritt, W Lengsfeld and M Silberberg (Jahrb f Kinderh 122 12) 1928) employed it in 20 children, 4 to 13 years of age Eighty per cent of the patients were cured and the remainder improved F J Poynton and B Schlesinger (Lancet 2 267 (Aug 10) 1929) used nirvanol in 6 cases of chorea The drug was given by mouth daily in doses of 0.3 Gm (5 grains) for a child of 9 to 14 years of age

Nirvanol was originally employed in various conditions for its hypnotic and sedative effect In chorea the

successful results do not depend upon the hypnotic effect, but upon a specific reaction, *nirvanol disease*, which develops as a rule between 8 to 14 days after beginning treatment. This reaction, in general, is characterized by an eruption, fever, and certain blood changes The most constant change in the blood is the eosinophilia, which reaches its maximum, as a rule, just before the appearance of the rash During the administration of the drug there is generally a leukopenia with a relative lymphocytosis and monocytosis The blood picture returns to normal as the general reaction subsides The rash is, as a rule, morbilliform in character, but occasionally is scarlatiniform or urticarial Fever is often present, lasting from 3 to 5 days

For the treatment to be successful, an attempt must be made to produce nirvanol disease and the drug must be stopped as soon as the typical reaction appears If no reaction has appeared by the fourteenth day, it not only is useless but it may be dangerous to continue with the treatment Leichtentritt and his co-workers have found that the administration of nirvanol to rabbits over a sufficiently long period will severely affect the bone-marrow, leading to an aleukemia

**Passive Hyperemia** — W Glaser (Munchen med Wchnschr 75 1288 (July, 27) 1928) treated two cases of chorea, 13 years of age, by producing passive hyperemia of the brain Cessation of the worst symptoms occurred in from 24 to 72 hours after starting the treatment and complete recovery within from 2 to 4 weeks The passive hyperemia was produced

by applying a rubber bandage (garter elastic) to the neck

**Serum and Antigen Treatment**—J. C. Small (Am. J. M. Sc. 175 638 (May) 1928), also Small and Riesman (Ann. Int. Med. 2 637 (Jan) 1929), has prepared an antiserum by immunizing horses and, more recently, cattle with the *Streptococcus cardio-arthritis*. The serum from these animals has been employed not only in chorea, but in rheumatic fever and rheumatic carditis as well. Clinical experience has shown that adequate doses range between 5 and 15 c.c. (1¼ drams to ½ ounce). Excessively large doses are contra-indicated because of the focal inflammatory reactions which they tend to precipitate. Striking results have followed the use of the antiserum in chorea minor. Choreic movements of long standing respond less rapidly to this therapy.

A soluble antigen of the *Streptococcus cardio-arthritis* in dilutions of 1:100,000 and 1:1000 has also been prepared for the purpose of producing an active and longer immunity. The 1:1000 dilution is injected subcutaneously in an initial dose of not more than 0.5 c.c. (8 minims) and maintained at this amount until no reaction following the injection can be detected. The dose is then increased by 25 to 50 per cent of that last given. Some students of rheumatism such as May Wilson (J. A. M. A. 94 842 (Mar. 22) 1930) could find no influence exerted by the antiserum or the soluble antigen.

**Tonsillectomy** as a *prophylactic* measure in the treatment of chorea may still be considered to be of questionable value. A. D. Kaiser (J. A.

M. A. 89 2239 (Dec. 31) 1927) analyzed a group of 102 children who had had chorea. He asserted that his figures demonstrated that chorea is as likely to occur in tonsillectomized as in non-tonsillectomized children. It is interesting to note, however, that the occurrence of carditis following chorea was apparently considerably lessened by tonsillectomy.

### CHOROID.—HEMANGIOMA.

—S. B. Marlow (Arch. Ophth. 57 165 (Mar.) 1928) reports a case of hemangioma of the choroid in a 19-year-old boy who had a nevus on the left side of the forehead. The appearance of the retina suggested detachment due to exudate. Vision was reduced to hand movements, and with increase in tension a secondary cataract appeared. As the pain became progressively more severe, the eye was removed. The pathological examination was made by Verhoeff.

**SARCOMA**—The most common malignant intraocular tumor, according to J. N. Greear, Jr. (Virginia M. Monthly 55 633 (Dec.) 1928) is sarcoma of the choroid. The development of this neoplasm shows the following 4 stages: (1) An early state, which may or may not be accompanied by detachment of the retina or disturbance of vision, (2) a glaucomatous stage, in which the eye usually assumes the appearance of acute congestive or absolute glaucoma, (3) a stage at which the tumor has extended beyond the confines of the globe, (4) a stage at which metastatic nodules are formed in the internal organs, most frequently the liver.

Years usually pass before the sarcoma has run its course although its



growth becomes more rapid in the later stages

In the **DIAGNOSIS**, the intraocular tension is of significance because it is normal or increased, whereas in simple detachment of the retina it is usually subnormal. Transillumination is of value. An accurate history regarding the vision in the eye prior to the attack and regarding the tension and refraction of the other eye is of importance. Localized varicosities of the anterior ciliary vessels and unusual pigmentation are of significance.

Sarcoma of the choroid appears between the ages of 15 and 85 years, but is most common between 40 and 60. Its prognosis is always grave. Metastases are usually formed within a few months after enucleation, but may not cause death until 5 or 10 years have elapsed.

The treatment is simple **enucleation** unless the tumor has extended beyond the globe, when **exenteration** of the orbit followed by radium and **x-ray** therapy is necessary.

Greear (*ibid*) reports 6 cases and draws the following conclusions:

Blind, painful, disfiguring eyes should be enucleated as malignancy is occasionally present in such eyes though not demonstrable.

Routine examination of the fundi is very necessary as sarcomata are sometimes found in apparently normal eyes.

Careful notes of repeated observations of suspicious pigmented deposits in the choroid are of importance.

Early sarcomata of the choroid simulate exudative choroiditis.

Early diagnosis and prompt radical measures are essential.

P. Pesme (*Gaz hebdomadaire des sciences médicales de Bordeaux* 788 (Dec 9) 1928) de-

scribes 2 cases of choroidal tumor, both of which appeared macroscopically to be leucosarcomata. On microscopical examination the first was found to consist of long fusiform cells with large nuclei arranged in whorls; there was general agreement as to the sarcomatous nature of this tumor. In the second case the cells composing the tumor were of a distinctly epithelial character. In both instances there was infiltration of the normal choroidal tissues by tumor cells, and secondary pigmentation of the tumor by normal chromatophore cells of the choroid. Sections of the second tumor were submitted to Mawas, of Paris, who confirmed the opinion as to the epithelial origin; he believes that such tumors are either melanotic epitheliomata arising directly from the choroid, or nevo-carcinomata derived indirectly through nevi. Redslob, of Nantes, on the other hand, considered the tumor to be of nerve origin. Pesme considers this unlikely because of the obvious malignant nature. There is general agreement that the tumor is of epiblastic origin.

G. H. Poos (*J. Missouri M. A.* 26. 331 (July) 1929) reported a case of melanosa of the choroid with extension into the orbit. R. C. Davenport (*Brit. J. Ophthalmology* 11 609 (Dec) 1927) reviews all cases (35 in number) of sarcoma of the choroid seen at Moorfields Eye Hospital during the period 1918-23, the average being 7 a year. Previous records of past series (1871-1925) show almost exactly the same yearly occurrence. Davenport thinks the case incidence at Moorfields nowadays is about 2 in 10,000. He has been able to trace 22 patients out of the 35, of these, 10

are known to be alive and well. Out of the whole series 28.5 per cent are known to have lived free from recurrence for more than 3 years after excision. Twelve patients (34.28 per cent of the whole series) are known to have died, and 7 of these (20 per cent of the whole series) died from recurrence of the sarcoma. Of the untraced cases, 2 were seen alive 3 years after operation.

**CILIARY BODY.—CARCINOMA, METASTATIC**—A Knapp (Arch Ophth 1:604 (May) 1929) reported a case of a woman 68 years old who presented a growth in the temporal side of the right eye which pushed the iris away from its peripheral attachment. After enucleation pathological examination proved that the tumor was a carcinoma. This type of tumor is always metastatic and in this case it probably originated in the breast which had been removed for adenocarcinoma.

**COLIC**—P. J. White (Am J Dis Child 38:935 (Nov) 1929) asserted that there is a relation between colic and infantile eczema. By the term colic he means a gastro-enterospasm with the syndrome of fretfulness, diarrhea, projectile vomiting and visible gastric or intestinal peristaltic waves. His series of patients included 10 infants with colic only, 10 infants with eczema only and 27 infants with both. An allergic family history was obtained in about the same percentage of each group. Infants who had both colic and eczema were, as the figures demonstrate, 3 times as numerous as those who had either condition alone. The administration of **atropine** relieved infants with colic alone much more readily

than those with eczema in addition. Cereal was equally well tolerated by each group. The writer expressed the belief that colic is a symptom of a disturbed function of the vagus nerve and that the underlying cause of both eczema and colic is a type of allergy. He indicated the sequence of illness to be first, colic, and then diarrhea and vomiting at about 2 to 4 weeks of age, and lastly, eczema at about 10 weeks.

**COLITIS, MUCOUS.**—The literature during the past 2 years denotes a renewed interest and better understanding of this condition concerning which very little had been written for several decades. A summary of some of the recent contributions indicate a uniformity of opinion concerning its etiology and management.

H. L. Bockus, J. Bank and S. A. Wilkinson (Am J M Sc 176:813 (Dec) 1928) analyzed 50 cases, stressing the neurogenic origin of the disorder and describing what they believe to be a characteristic sigmoidoscopic picture. "The mucosa of the rectum and sigmoid is usually clean and free from any sign of exudation, ulceration or inflammation. It possesses a glistening, glairy or shining lustrous appearance. Hyperemia or pallor of the mucosa may be encountered in a few cases. There is usually some mucus in the lumen of the rectum or sigmoid. The gross and microscopic appearance of the mucus, which can best be obtained through the sigmoidoscope, is also characteristic. This mucus, in uncomplicated cases, is free from the microscopic evidence of inflammation of the mucosa. Occasionally mucus may be adherent to the mucosa. Its

removal causes bleeding” In these cases a concomitant catarrhal colitis was considered to be responsible They find little justification, either from sigmoidoscopy or the character of the mucus, for attributing this condition to inflammation of the colon The importance of considering mucous colitis as a cause of periodic abdominal pain of considerable severity is emphasized by an incidence of unnecessary laparotomy in 16 per cent of their cases However, mucous colic was present in a minority of patients The colic attacks were not necessarily dependent upon the formation and expulsion of membranes, but were in the majority of cases due to concomitant spasm The most common situation of the pain was the lower left quadrant

Seventy-six per cent of their cases were constipated, but the constipation was thought to be the result of the underlying disturbed innervation and not a cause of the colitis Dyspeptic symptoms were common The underlying nervous constitutional factor is stressed Most patients were of a hypersensitive “impressionistic” nature Emotional instability, depression, exhaustion and introspection were the most frequent nervous phenomena Very few patients had a definite psychoneurosis The vegetative nervous system was investigated for its possible etiological relationship to mucous colitis It is their belief that the etiology of mucous colitis is in some way linked to abnormality in function of the vegetative system Most cases revealed evidence of overactivity of both the parasympathetic and the sympathetic systems, although the symptoms and signs usually attributed

to stimulation of the extended vagus mechanism were more pronounced Food allergy may have been responsible for symptoms in 2 cases or 4 per cent of the series The combined use of **calcium** by mouth and **parathyroid gland** intramuscularly was followed by considerable subjective improvement in most cases upon which it was tried

J Friedenwald, M Feldman and L J Rosenthal (Trans Assoc Am Phys 44 324, 1929) have also contributed an instructive article dealing with this condition and have critically analyzed and reviewed 500 cases of mucous colitis They believe the affection is largely of nervous origin and that the mucous discharge may be considered a nervous hypersecretion The condition once established may continue on with exacerbations and remissions for an indefinite period of time, associated with spasticity of the colon from which recovery may occur, or, in some instances, due to a prolonged period of lowered resistance, infection may take place with the production of inflammatory changes of a more or less aggravated type, which finally may eventuate in the production of an ulcerative colitis The importance of a constitutional factor etiologically, is stressed indicating a correlation between the physical type in the form of the hyposthenic individual and the secretory and motor disturbances noted in mucous colitis This natural predisposition toward bowel dysfunction, was accentuated in their cases by prolonged nervous strain and emotions

As contributory factors associated with the development of mucous colitis, they listed the following conditions

	Percentage
1 Chronic constipation occurred in	72
2 Visceroptosis	58
3 Chronic cholecystitis	18
4 Chronic appendicitis	13
5 Chronic pelvis disease	15
6 Endocrine dysfunction—	
Hyperthyroidism	9
Hypothyroidism	3
7 Food allergy	1
8 Abdominal adhesions	37
9 Gastric dyspepsia	64
10 Intestinal dyspepsia	27
11 Focal infections	23

The greater incidence among females is noteworthy in this series, the ratio being 5½ females to 1 male. Eighty-seven per cent of their cases presented sigmoidoscopic evidence of mucous colitis. They describe 3 stages of the disease, as shown by sigmoidoscopic examination. In the *first* stage the vessels of the bowel are greatly engorged and the capillary injection especially prominent, the mucous membrane being covered with a glairy mucus which gives an appearance similar to that of a shad roe. In the *second* stage the intense engorgement of the membrane is no longer present, nor do the vessels stand out as prominently. Neither the intense glairy appearance of the membrane nor the marked increase of mucous covering the entire mucous membrane are observed, but distinct areas in which the mucosa is covered with a thick tenacious mucus which adheres closely and which at times can only be removed with difficulty. This condition passes gradually into a *third* stage in which the mucous membrane seems to be thinned out, pale, covered with mucus and, at times, membranes are noted. When these membranes are removed, small pin-head ulcerations are observed. These are not typical ulcerations but

appear as though the mucous membrane is slightly denuded of its superficial surface. They have noted a return of the mucosa to an almost normal appearance by washing with a solution of bicarbonate of soda.

Considerable importance is attached to the x-ray examination by these observers in mucous colitis. Spasm of the bowel is an early finding but in no way pathognomonic. During the second stage a feathery appearance is observed, looking not unlike the normal appearance of small bowel. In the third stage the characteristic "string sign" of mucous colitis may be present. It is considered a late sign by Friedenwald, Feldman and Rosenthal (*ibid*) and was noted in 10 per cent of their cases.

Barker (Am J M Sc 178 606 (Nov) 1929), writing on the management of the spastic colon and mucous colopathy, especially in hypervagotonic persons, concurs in the opinions expressed in the above contributions. He states that heightened irritability of the neural and muscular mechanism leads to spasms, disturbances of co-ordination of colonic contraction and increased and perverted activity of the glands that secrete mucus. Fatigue and depression may precipitate an intestinal spastic state which, in turn, can accentuate the feelings of exhaustion and sadness that are already present. He likewise draws attention to the danger of attributing the pain of this condition to a severe abdominal condition such as duodenal ulcer, gall-stones or renal colic or acute appendicitis. The frequency with which such patients are operated upon unnecessarily indicates that such errors are not uncommon. He suggests codeine or pantopon and atro-

pine for the relief of the attacks. After the attacks, the treatment should be directed toward the prevention of spasm and constipation, toward combating any complicating catarrh of the colon and toward the overcoming of the general neurosis. He, likewise, suggests the use of calcium and parathyroid gland as an adjunct to the bland diet and other usual measures.

Duke, Andresen and Hollander have each reported cases of mucous colitis which were induced by hypersensitiveness to certain foods. W T Vaughan (South M J 21 894 (Nov) 1928) reported improvement in 7 of 11 cases of mucous colitis by the avoidance of a specific protein to which the patient was sensitive. He has obtained his best results in those cases in which there were minimal secondary changes and minimal nervous manifestations.

Girand and Turries (Marseille-méd 65 797 (Dec 25) 1928) noted a frequent occurrence of chronic colitis in persons, particularly children, whose lymphatic tissues had definite predisposition to infection and hypertrophy. They feel that the intestinal lymph follicles become involved primarily, then the mucous membrane as a whole is affected and a chronic or recurrent mucous colitis develops. These cases respond promptly to general tonic measures such as heliotherapy, actinotherapy, hydrotherapy or climatotherapy, but are refractory to the ordinary treatment for colitis, according to these authors.

One might concisely summarize the present day version concerning mucous colitis as follows:

**ETIOLOGY**—The soil upon which mucous colitis develops is an

unstable nervous system. Most patients are hypersensitive impressionistic types whose emotions are near to the surface. As a class, they are temperamental people. The ailment is probably becoming more prevalent as civilization becomes more complex. The incidence is greater among city dwellers and in brain workers. A history of "nervous breakdown" is not infrequent. A true psychoneurosis is rarely present. The immediate cause is a hypersecretion of the mucous glands of the bowel induced, in most instances, by an unstable vegetative nervous system. An attack of mucous colitis following an emotional upset emphasizes the effect of emotions upon vegetative function. There is a preponderance of parasympathetic impulses in many if not in every case, although our present methods of examination can frequently go no further than suggest a generalized vegetative upset. If trauma to the nervous system sufficient to induce an attack occurs, the tendency for recurrence to develop will persist for years. The ailment is characterized by exacerbations and remissions. The disturbed innervation of the colon is manifested not only by overproduction of mucus but by faulty muscular activity of the bowel, more particularly spasm, and often hyperperistalsis and hypermotility. It is questionable if a separate classification of spastic colon and mucous colitis is justifiable. The underlying etiology is the same. Mucous colitis is almost always associated with excessive spasm and cases of spastic colon usually have periods of excessive mucus discharge. The treatment is identical. Certain cases of mucous spastic colitis are without

doubt dependent upon an inflammatory focus in the abdomen sufficient to excite autonomic reflex activity in individuals who do not show the neuropathic stigmata. These cases, however, are quite exceptional, for the removal of a diseased viscus like the tubes, ovaries, appendix or gall-bladder, rarely affects the so-called "colitis" which continues just as before the operation.

The disturbance is much more frequently encountered in patients with the *habitus enteroptoticus* of Stiller. People of this build more frequently have the neurogenic instability upon which mucous colitis is so frequently engrafted. It is doubtful, however, if the ptosis *per se* is an important etiological factor. Allergy cannot be considered to play a very important part in the production of mucous colitis. Its rôle is insignificant in most patients. However, the "mucous colopathy" group are generally hypersensitive and show vegetative imbalance. Protein hypersensitiveness is also quite common in this type of individual, so that food hypersensitiveness may be more common in patients with mucous colitis than in normal individuals.

**SYMPTOMATOLOGY** — Females are more frequently affected, the rate being about 4 to 1. The average age is 35 years, the ailment being comparatively rare in childhood and in old age. The symptoms in mucous colitis are usually intermittent, coming on in attacks, with remissions of varying periods. The attack is usually precipitated by some emotional, nervous or physical strain or illness. The onset of the initial attacks almost always dates from some such event.

The cardinal symptoms are ab-

dominal pain, disordered bowel function, the passage of mucus and nervousness. Not infrequently a period of constipation associated with the passage of hard scybala, is followed by frequency of defecation with a copious discharge of mucus. Cramps usually accompany the latter phase, relieved for a time by each bowel movement. A great many patients do not present such a characteristic chain of symptoms.

Abdominal pain is to be expected in about 75 per cent of cases. It may be so severe that it is mistaken for an acute inflammatory lesion. Many patients have been operated upon unnecessarily on this account. The pain may be slight or moderate in severity. It is often crampy in nature and related to defecation, usually relieved temporarily by the latter. This relationship to defecation or the expulsion of flatus is of the utmost importance in assigning the site of the trouble to the colon. The pain may be constant for long periods. The situation of the pain or discomfort varies a great deal. The lower left quadrant is the most common location, but it may be of a colicky type felt all over the abdomen. It is more frequent below, than above, the umbilicus.

A history of constipation is obtained in about three-fourths of the cases, however, frequency of defecation may occur during an acute attack. These patients usually do not have diarrhea in the true sense. The so-called loose bowel movements may merely be due to the frequent passage of mucus, the feces remaining hard and firm, constipation really persisting throughout. However, bowel hypermotility may supervene and a

true diarrhea ensue. In fact, some patients who develop a mucous colitis have always had a tendency to bowel hypermotility, giving a history of passing 2 or 3 bowel movements daily all their lives.

The third cardinal symptom is the passage of mucus. Frequently it is not recognized by the patient. The mucus may be liquid, jelly-like in consistency or membranous. It may be mixed with a thin stool, be found on the outside of a firm stool, or be passed as pure mucus unadulterated by feces. A concomitant catarrh of the mucous membrane is usually present in the cases in which membranes are expelled.

De Langenhangen used the expression "excessive nervous impressionability" to describe the nervous state in this group, which is an admirable one to describe many patients. Depression, exhaustion, introspection and various phobias are common nervous manifestations. Gaseous indigestion of a gastric or intestinal type is quite frequently present. These vague dyspeptic symptoms are not uncommon even between attacks of colic.

*Physical Examination*—The habitus of the individual should be taken into consideration, since the "mucous colopathy" is found in association with the congenital asthenic build of Stiller in over half the cases. The colon, more particularly the lower descending portion, is tender in most patients during the attacks and in many between attacks. The left colon is often felt as a thin firm tense sausage. The abdominal parietes are frequently tender in patients of this build with mucous colitis (Carnett).

Sigmoidoscopy is highly recommended

as a diagnostic method of great value. The sigmoidoscopic picture has been described in the papers reviewed. The method is of great importance in ruling out organic disease. The introduction of the instrument or of air into the sigmoid often induces pain similar to the chief complaint in cases of spastic colon or mucous colitis. Mucus can be obtained through the tube for examination. The degree of spasm encountered in the sigmoid may be used as an index of the importance of spasm in a particular patient. The gross appearance of the mucus in non-inflammatory cases is quite characteristic. It is usually of the consistency and color of egg albumen. Under the microscope it is quite devoid of epithelial debris and the elements of inflammation.

*X-ray Study*—Friedenwald, Feldman and Rosenthal (*loc cit*) have summarized the x-ray findings as follows:

"The x-ray furnishes important information in the diagnosis of mucous colitis and in obscure forms is often invaluable. The technic is followed as in the usual routine gastro-intestinal examination. Mucous colitis is best revealed from the twelfth to twenty-fourth hour examination. The patient is required to return the morning following the administration of the barium meal and after a bowel movement, if possible. Not infrequently, following this action the x-ray signs are observed to the best advantage. If no bowel movement occurs, only a very small area of the bowel may present the so-called 'string sign' or there may be only spasm at hand with marked increase of the haustra, or finally, no x-ray

evidence whatever will be noted in the examination. Spasm of the bowel is an early x-ray finding of this affection but occurs in so many other conditions that its significance is much lessened. During the second stage, a feathery appearance of the bowel is observed, most frequently noted in the descending colon. The feathering of the colon simulates the appearance of the small bowel. In the third stage the typical 'string sign' is revealed which is extremely characteristic of mucous colitis. The fluoroscopic examination during the 18-hour period does not always reveal these changes, due to the small amount of the opaque meal in the bowel. At times the 'string sign' is so thin and faint, that it can only be determined on a well-taken film. This occurs so frequently according to our experience, that we no longer rely on the fluoroscopic examination.

"The 'string sign' of mucous colitis is not a constant finding, but, when present, is best observed from the twelfth to the twenty-fourth hour examination. It may be revealed at any portion of the colon, the most frequent site being in the descending colon, transverse colon to a lesser degree. The ascending colon and cecum may also present this sign in rare instances. The caliber of the string line varies usually from  $\frac{1}{2}$  to 2 mm in diameter, but may be larger in some instances. The line is usually straight and continuous and, as a rule, presents no break in its full length. Very frequently the string sign begins with the feathery appearance for several inches and then tapers off into the string. According to Crane, the 'string sign' is produced through the spasticity of the bowel associated with

certain peristaltic movements upon the mucoid material. It is, according to our experience, a late sign of this affection and occurred in 10 per cent of our cases.

"The routine barium colon enema does not always present much direct evidence, the meal flows up the colon readily and no abnormality of the lumen is noted under the fluoroscope, while in the film, very frequently the descending colon will reveal an absence of haustra and, at times, some narrowing which is quite suggestive of a colitis. In our routine enema an immediate film is made of the colon and another film following the evacuation of the barium. In the latter examination the string sign or feathery appearance of the colon will often be revealed in cases of mucous colitis. It has often been observed according to our experience, even when the routine gastro-intestinal study is negative."

The **PROGNOSIS** for permanent cure is not good, but in most instances a marked improvement can be accomplished and the more serious symptoms controlled.

**TREATMENT**—This should be directed toward the relief of (1) the acute attack and (2) the measures for the correction of the underlying condition. 1 The drug of first importance is **belladonna** or one of its derivatives, particularly **atropine**. It should be given in sufficient dosage to maintain a physiological effect until the acute symptoms have subsided. It may be combined with **bromides** or other sedatives to advantage in some cases. **Opiates** should be avoided because the frequency of recurrences may induce a habit. The application of **heat** externally is very



beneficial **Hot moist applications** frequently applied are often superior to a hot water bottle or heating pad. A **warm tub bath** or a **hot Sitz bath** may bring about relief if spasm is severe. If constipation is present and particularly if the stools are scybalous, a **warm injection** of 8 ounces (240 c c) of **olive oil** will prove of benefit. A small **enema** of **warm saline** is often helpful.

2 After the acute attack has subsided certain measures are necessary to prevent a recurrence. A smooth, bland, non-putrefactive diet, free from roughage, is indicated. The constipation will require attention. The regimen commonly employed in the treatment of the spastic colon is usually followed. Small doses of **mineral oil** to prevent irritation of the mucosa, as a result of undue inspissation of feces, seems logical. **Lactose**, 1 to 4 ounces (30 to 120 Gm) daily, if added to the diet, tends to overcome putrefaction. It usually has a laxative effect and tends to increase nutrition which is so often under par. **Calcium lactate** in dram (4 c c) doses, 3 times a day, may tend to relax spasm and reduce mucus secretion by virtue of its effect on the parasympathetic system. Its effect may possibly be increased by using **parathormone** 0.75 c c (12 minims) every second or third day intramuscularly. **Belladonna** should usually be continued for several weeks after the subsidence of the acute attack. **Kaolin** or **kaylene**, 2 or 3 drams (8 to 12 Gm) daily, may be used to increase the bulk of the stool and assist in the elimination of the mucus. **Magnesium oxide** may be combined with it, if necessary, for the constipation. It is the general feeling that

colon irrigations and irritating enemas had better be avoided in cases with excessive spasm and mucous colitis. They are often quite painful and theoretically their use in this condition would seem to be contraindicated. A simple neurogenic colitis may be converted into a catarrhal colitis by colonic irrigations.

The most important phase of treatment, aside from the measures to correct constipation, is an attempt to benefit the underlying nervous state. In many instances the nervous instability is inherent or hereditary and cannot be changed. Individuals must be taught to adapt themselves to their environment so as to avoid nervous stress and strain. The problem in each case is different but the principles are the same. Particular attention must be paid to **hygiene**, ample **exercise**, **rest periods**, **frequent vacations**, **avoidance of stimulants** particularly **tobacco** and **alcohol**, etc. The patient's general resistance should be raised as much as possible. Weight gain is an essential in most cases.

### COLLOIDAL THERAPY.—

The principle on which the use of colloidal preparations is based is mainly the idea that, since in ionic, atomic, or molecular form, certain compounds produce in low concentrations toxic effects which counterbalance the beneficial results, it might be possible by presenting the effective agent to the body in colloidal form or protected by colloid to bring about such slow or gradual liberation in minute concentrations that the therapeutic effect would predominate and the toxic be largely avoided. For a long time the therapeutic value

of the heavy metals has been known. The toxicity for rabbits of colloidal metallic sulfides as studied by G. E. Wakerlin and C. Eisman (Am J Syph 12 384 (July) 1928) is significant. The colloids of mercury sulfide, copper sulfarsenite, bismuth sulfide, mercury-copper sulfide, mercury-copper sulfarsenite, and flumerium were tried. The protective proteins used in the preparations were non-toxic and non-anaphylactic. None of the solutions were locally irritating. Comparatively large doses of colloidal lead and gold sulfides in dogs gave no bad effects. Colloidal lead sulfide was found to be one-thirtieth as toxic as the Blair Bell preparations.

The chief present interest in colloidal therapy is in the use of *lead* in **malignancy**. This agent was first given prominence by Blair Bell, and has had wide spread testing with contradictory results in different hands. In fact it has been largely dropped save by a few enthusiasts because of the toxic sequelæ. Further exact experiment has failed to substantiate Bell's claims that the metal concentrates in tumor tissue. W. J. Dilling (J Pharmacol and Exper Therap 33 449 (Apr) 1929) reports that intravenously injected colloidal lead concentrates primarily in the large phagocytic cells of the spleen and occasionally in the endothelial cells.

The Kupfer cells of the liver also accumulate the metal in significant amounts. This is consistent with the finding that liver injury is of great importance in determining whether or not colloidal lead treatment is to be undertaken. If F. S. Hammett's (Arch Path 8 575 (Oct) 1929) postulate that cell proliferation in malignancy is chemically regulated by

—SH and its reaction products, as it is in normal growth by increase in cell number, is correct, it is clear why such variable results with lead and other metals are observed. For not only does lead precipitate out the accelerating agent —SH but also the inhibitive agents —SO<sub>2</sub>, etc. Experiments with *colloidal* preparations of *selenium* and *tellurium* as carried out by British workers have given apparently more hopeful results but no claims are made for curative properties by these conservative investigators. It is to be seriously questioned whether colloidal metal or any metal therapy in **malignancy** will ever develop to permanent value since the basis of the treatment is at odds with the biological fundamentals.

Recent studies indicate that the therapeutic use of dyes by intravenous administration properly belongs to the field of colloidal therapy, since many of the antiseptic dyes previously thought to be dissolved as crystalloids have been found to be in the colloid state and some which are crystalloid in water solutions become partly colloidal in physiological saline, the form in which they are usually administered. This finding may be at the basis of the colloidoclastic reaction which frequently obtains when dyes are used. The high hopes held out at first for the use of *acacia* solutions in **shock** seem not to have been realized. Whether this is due to a mistake in premise or to by-reactions as yet unknown has not been established.

**COLON, TUMORS OF —CANCER.—SYMPTOMS**—Common symptoms of carcinoma of the colon, according to E. Goetsch and A. Goetsch (Arch. Surg 18 998 (Apr) 1929),

are anorexia, loss of weight, mild colicky pains, pallor, weakness, and anemia. Frequently there is progressive constipation, and in the more advanced stages, visible peristaltic waves, nausea, and vomiting. Acute intestinal obstruction may be the first symptom, yet the absence of blood from the stools by no means precludes the presence of cancer.

The early symptoms of carcinoma of the colon and rectum, according to A. P. Hurst, T. W. Turner and J. F. Venables (*Lancet* 1 1275 (June 23) 1928), are abdominal discomfort or pain and change in the habitual action of the bowel. Discomfort is localized in the segment of the bowel proximal to the obstruction and is of the small-intestine type. In cancer of the cecum it is felt in the neighborhood of the umbilicus, in cancer of the ascending colon or hepatic flexure, on the right side of the abdomen, in cancer of the splenic flexure, in the descending and iliac colon, and in the proximal part of the pelvic colon it is felt on the left side. Pain from a growth in the middle segment of the transverse colon is felt just below the umbilicus, and that caused by a growth in the distal part of the pelvic colon or pelvic flexure is localized in the middle line between the umbilicus and the pubes. The pain is often colicky, and its cessation may coincide with the gurgle which can be heard and felt. Constipation or diarrhea, or both, may be present. In the early stages, general symptoms are rare. At first, there is no anemia and no loss of weight. The appetite may be good and the energy, undiminished. Blood or pus in the stools is suggestive. A fluid or semi-

fluid stool suggests ulcerative colitis, but if, in addition, fragments of solid feces are found, a growth of the pelvic colon or rectum is to be thought of. In a growth proximal to the pelvic colon, visible blood and pus are hardly ever observed. Occult blood is almost invariable, but it is found in uncomplicated diverticulitis and never in constipation or diarrhea unaccompanied by organic disease. A local band of adhesions involving the colon may also lead to the constant presence of occult blood in the stools. The average duration of symptoms before the diagnosis in 25 cases was 10 months.

Among other symptoms, W. I. de C. Wheeler (*Proc. Royal Soc. Med. (Sect. Surg., Sub-Sect. Proct.)* 21 59 (July) 1928) mentions painful peristalsis of the colon or pyloric spasm immediately after food, which may lead to the faulty diagnosis of an upper abdominal lesion. Cancers of the hepatic and splenic flexures are best palpated with the patient in the erect stooping position. Palpable peristalsis is a reliable sign of obstruction of the colon, teasing tenesmus is a constant symptom of rectal growth. Digital and sigmoidoscopic examinations are too infrequently made. Cancers of the lower colon and rectum are external cancers from the diagnostic point of view.

**DIAGNOSIS** —The x-rays show the proximal distention and stasis long before the symptoms of obstruction develop.

A. Renander (*Acta radiol.* 9 213, 1928) found the x-ray examination positive in 86 per cent and the clinical method accurate in 56 per cent. Of the operable cases, the x-ray examina-

tion gave a positive result in 91 per cent. and the clinical diagnosis, in 48 per cent. In inoperable cases the x-ray examination was positive in 82 per cent, and the clinical method positive in 70 per cent. Renander believes that the clinician is aided most by x-ray examination in cases of operable tumors of the colon.

Important signs were noted by G. Grey Turner (*Brit Med Jour* 1 920 (May 18) 1929). Recurrent attacks of colic with or without complete relief in between, hemorrhages from the bowel in persons past middle life, bowel growths being discovered by abdominal, rectal, or bimanual examination, the use of the sigmoidoscope, and the barium x-ray enema. Turner refers to 5 accidental perforations of the sigmoid by the sigmoidoscope.

The combination of injections of finely divided contrast material and air inflation—the method of Fischer—is extolled. In the differential diagnosis, diverticulitis of the sigmoid is differentiated into the acute stage, the hyperplastic tumor-like stage, and the cicatricial-stenotic stage. Although W. J. Mayo believes that malignant degeneration in diverticulitis occurs in 30 per cent, Schmieden does not consider it very high. There is a very close relation between the development of carcinoma and polyposis.

Of 315 cases of malignancy of the colon reported by J. F. Erdman and H. Clark (*Ann Surg* 89 54 (Jan) 1929), the rectum and rectal sigmoid were involved in 103, the sigmoid proper, in 105, the cecum and ascending colon, in 51, the terminal transverse, splenic, and descending, in 35, and the terminal ascending, hepatic

and proximal transverse colon, in 21. The recto-anal segment is involved more frequently in women than in men. The rapidity of the growth is influenced by the age of the patient and the type of the cell. Carcinoma of the bowel is more common than carcinoma of the stomach. No case of acute ileus was observed, but several had cramp-like colic of the lower quadrant with narrowing of the ileocecal valve due to invasion by the growth. Anemia was constant and more severe the higher in the colon the growth occurred. In the cecum and ascending colon, palpatory and x-ray evidence is late. In the sigmoid zone, the tumor is shown earlier by the x-ray study. In obstruction, partial or complete, a metallic tinkle, heard with the ear over the cecal region when the opposite side is sharply pushed toward the median line, is considered an infallible sign, indicating immediate operation. Proctoscopic and x-ray examinations are of great value.

In 81 cases of carcinoma of the colon reviewed by A. Newton and H. Searby (*New Zealand M J* 28 83 (Apr) 1929), the average age of the patient was 57 years. Massive fungating carcinomas were  $1\frac{1}{2}$  times more common than the annular type. Ulcerative carcinomas were comparatively rare. Of the fungating type, 41 per cent were operable, of the ring type, 60 per cent. The average duration of symptoms in the operable cases was 7 months. Acute obstruction was present in 44 per cent of carcinomas of the left half of the colon but in only 1 of 13 cases of cancers of the right half of the colon. Perforation was usually fatal. Two

great operative dangers are infection from manipulation of the tumor and the adjacent infected bowel and leakage from the suture line. For the right half of the colon, resection of the cecum and ascending colon with lateral anastomosis of the terminal ileum to the transverse colon is the method of choice, while in the left half of the colon an operation performed in stages is necessary. Mikulicz's operation is safest and yields good results. In severe cases of acute obstruction, a blind cecostomy is the best procedure.

Of 192 cases of intestinal carcinoma studied by L. Kuttner and G. Scherk (Med Klin 24 1375 (Sept 7) 1928), the colon was involved in 79 and the rectum in 113. In only 7 was there a history of gastrointestinal carcinoma in the parents. Of these patients, 21.3 per cent were younger than 50 years and 3.6 per cent between 20 and 30. Pain was almost invariable, with localization in the colon, while 30 per cent of those with localization in the rectum were free from pain. In rectal carcinoma, the pain was frequently in the legs or sacrum and was of a sciatic type. In more than  $\frac{1}{4}$  of the cases of rectal carcinoma, the general nutrition and strength were good. Even a gain of weight may be present. Anemia was present in 25 per cent, fever, generally intermittent, in 19.1 per cent. Change in the frequency or consistency of the stool was the first symptom in 85 per cent of the patients with rectal carcinoma and only 4.2 per cent of those with carcinoma of the colon. In the latter, gastric symptoms and general abdominal pains were prominent. In 61.4 per cent of the cases, operation

was performed—radical in 43.1 per cent with rectal localization, in 15.2 per cent with localization elsewhere in the intestine. The mortality was 76.6 per cent in carcinoma of the small or large intestine, 44.8 per cent in those of rectal carcinoma. Many of the patients who died were operated on in total ileus.

Development of bowel disturbances, such as constipation and diarrhea, in persons more than 40 years of age should always arouse suspicion of malignancy of the colon, according to Hollaender (Orvosképzés 18 487, 1928). Occult blood is nearly invariable, and gastric analyses usually show anacidity or hyperacidity. Small tumors which do not cause obstruction may cause intestinal spasm.

**FEVER**—Fever without other symptoms or x-ray evidence was found in 4 cases reported by R. Tscherning (Munchen. med Wchnschr 75 1121 (June 28) 1928).

**PRECANCEROUS LESIONS** in the rectum and colon are discussed by J. P. Lockhart-Mummery and C. Dukes (Surg, Gynec and Obst 46 591 (May) 1928). Neglected piles and chronic pruritus do not terminate in cancer nor does chronic constipation seem to predispose to malignancy. Adenomata and polyps, however, often terminate in carcinoma. Every patch of hyperplasia or every adenoma does not develop into a cancer. When adenomas are removed, they apparently do not tend to recur in the same spot, but other adenomas tend to develop in the neighboring mucous membrane. All cases with multiple adenomatosis should be kept under very close observation.

**PROGNOSIS**—Patients with carcinoma of the rectum or colon first

consult a surgeon when symptoms of acute intestinal obstruction, anemia and the passage of blood, mucus, and pus indicate terminal and wide pathological changes. Seventy per cent of the cases entering hospitals for the first time are inoperable. A five-year cure is obtained from early operations in 50 per cent. of the cases of rectal cancer and in over 60 per cent of the cases of cancer of the colon. According to Butlin, 55 per cent of the growths of the colon remain localized until death. The x-ray examination, though important, should not be implicitly relied upon. If the affected bowel lies with its axis in the direction of the x-ray, the defect will not be seen in the barium shadow. By bimanual examination, 90 per cent of the growths in the rectum, rectosigmoid, or lower sigmoid, can be palpated. The symptoms of appendicitis on the left side suggest carcinoma. In the young, cancer of the stomach and rectum is more frequent than cancer of the colon. A hyperplastic tuberculous infiltration probably simulates cancer of the colon more closely than any other condition. A hemoglobin value as low as from 20 to 30 per cent does not contraindicate operation for cancer of the bowel as it does in the stomach. Hodgson recommends dual x-ray exposure at intervals of 2 or 3 seconds on the same film as the earliest demonstrable x-ray sign of malignancy. The method employed is as follows: the patient holds his or her breath until both exposures are made, the bowel being distended with warm fluid. Two peristaltic waves can be seen except where the bowel wall is diseased. In the diseased area, there

will be no peristaltic wave and, consequently, no double shadow.

Cancer of the colon is distinctly less virulent than other cancers and metastasizes later, according to C. J. MacAuley (Brit Med Jour 1 187 (Feb 2) 1929). In the proximal colon, the growth is usually of the fungating cauliflower type and forms a definite mass, situated most frequently at the ceco-colic junction. In the distal colon, tumor is not often felt (Brown found it in 24 per cent). Some degree of obstruction is very frequent. When the splenic flexure is involved, obstruction occurs in practically 100 per cent. In the transverse colon, the growth may be of either type, but in the left end of the transverse colon the sclerosing form predominates, and, therefore, there is obstruction. Owing to the juxtaposition of the stomach and great omentum, gastric complications are not unusual, and the symptoms may be mainly of the dyspeptic type. Burgess found obstructive symptoms in 87 per cent of cancer of the left colon and 13 per cent in the right.

**OPERATIVE TREATMENT**—In clinical cases colostomy is often the only procedure compatible with safety. With the growth proximal to the middle third of the transverse colon, the second stage of the operation consists in division of the terminal ileum and an ileocolostomy with or without division of the transverse colon proximal to the ileocolostomy. At the third stage, the growth and excluded bowel are removed. By isolating the small intestines from the field of operation with the omentum, danger of gross infection is greatly decreased.

In the 919 cases of colostomy reviewed by Rankin, the mortality was

7.67 per cent where the operation was used as a palliative measure, and 2.7 per cent when used as a first-stage operation. The highest mortality was associated with acute obstruction, nearly half the patients dying after the primary operation. It is important to explore the abdomen before the growth itself is handled, to avoid infection.

Radium or x-ray therapy, according to Erdman and Clark (*loc cit*), are only to be considered in the treatment with *inoperable growth*. For the site of the artificial anus, Erdman prefers the cecum. In rectosigmoid operations, **rectosigmoidostomy** is done with resection of the lower bowel or turning in the lower stump as in the Coffey method. In growths between the *cecum* and the *lower sigmoid*, the operation of Mikulicz is used. End-to-end anastomosis, with a plastic on the smaller end, is a safe procedure between the *cecum* and the *midtransverse colon*, but near and in the portion of gut with a wide mesenteric attachment either the **side-to-side** or the **Mikulicz operation** should be done. Operations on the lower segment are readily performed through the perineum, with or without removal of the coccyx.

Schmieden (Verhandl d Gesellschaft Verdauungs- u Stoffwechselkrankh 278-307, 1927) points out that primary alveolar carcinoma of the intestinal mucosa are refractory to present-day deep x-ray therapy and that only the surgical removal of cancer of the colon offers a hope for eradication.

In 241 operations for cancer of the colon, Turner (*loc cit*) was able to do some type of resection in 142, a palliative operation in 85, and only

an exploratory laparotomy in 14. In the 142 cases of resection there were 25 deaths, the mortality being 14 per cent since 1919. Sixty-nine growths involved the sigmoid, 22, the cecum, 6, the ascending colon, 7, the hepatic flexure, 14, the transverse colon, 15, the splenic flexure, and 9, the descending colon. Of 27 deaths, in 15 the cause was peritonitis or sepsis, in 3, intestinal obstruction, in 3, pneumonia, and in 1 case each, hemorrhage, shock, diarrhea, heart failure, exhaustion, and an unknown cause. Seventy of the operations were done in 1 stage and 72 in 2 or more stages. In all, 267 operations were required. The mortality of the 1-stage operation was 25.71 per cent and of the 2-multiple-stage operation, 12.5 per cent. Excision with restoration of continuity of the bowel was performed in 124. Of the 115 patients who survived the operation, 32 lived more than 5 years, 31 were known to be alive without recurrence less than 5 years, 2 died within a year without recurrence, 41 were known to have died of recurrence, 3 were alive, but with recurrence, 6 had not been traced, 2 survived more than 15 years, 7 more than 10 years, and 9 for longer than 7 years. Therefore, 39 per cent were alive without recurrence.

Preliminary drainage in cases of obstruction is a necessity, and for a big distended abdomen a blind **cecostomy** or preliminary **colostomy** is advocated. For resection, proper mobilization of the growth is very important.

**COLLOID CARCINOMA** of the colon and rectum were found by F. W. Rankin and C. L. Chumley (Arch. Surg 18:129 (Jan pt 1) 1929) in 5 per

cent of 3202 cases of carcinoma of the colon and rectum. A high percentage of these were of a low grade of malignancy, but showed a high grade of mucus formation. In the lower grades of malignancy, there was a tendency for the amount of mucus present to be inversely proportional to the grade of malignancy. If the lymph nodes, however, are involved, the prognosis is unfavorable, regardless of the grade of malignancy and the amount of mucus present.

**MULTIPLE POLYPOSIS**—The 2 distinct types of polyposis are the acquired and congenital, according to H. E. Hullsiek (*Surg., Gynec. and Obst.*, 47:346 (Sept.) 1928). Multiple polyposis is most common in childhood and youth. In the 127 cases reviewed, the average age was 30.9 years. Males and females are about equally affected, and the symptoms are present for long periods of time before treatment is sought. There is a definite hereditary tendency toward the disease, and malignancy develops in about 35 per cent. Lockhart-Mummery divides the adenomata occurring in the bowel into (1) true multiple adenomata, (2) polyps associated with hyperplastic tuberculosis, (3) multiple polyps associated with an old stricture of the colon, and (4) polypoid conditions from ulcerative colitis, while Erdmann and Morris, from a clinical basis, consider (1) the adult-acquired type and (2) the adolescent, congenital, disseminated type. Frequently polyposis can be traced through several generations, a large percentage of the members of the families dying at an early age from cancer of the bowel.

Familial intestinal polyposis is also

accentuated by O. Jungling (*Beitr. z. klin. Chir.* 143:476, 1928), who found 15 cases occurring in 3 generations of 1 family. As the rectal mucosa is inflamed, granular, characterized by polyps, the author believes that the underlying cause is an hereditary sensitiveness of the rectal mucosa to the chemical and mechanical irritants passing over it.

V. Schmieden and H. Westhues (*Deutsche Ztschr. f. Chir.* 202:1 1927), in their discussion of intestinal polyposis, consider 1 type of polyps of the colon as precancerous, and that this form nearly always becomes carcinomatous before the polyps reach the size of a pea. The slender regular polyp cells lose their regular arrangement, the cells become plumper, and the nuclei become irregular in position and shape. The authors believe that about 60 per cent of all carcinomata of the rectum and colon arise from polyps. Previously overlooked polyps were found in 50 per cent of all autopsy specimens. The authors insist upon a radical abdominosacral resection of the rectum in carcinoma of the rectum and sigmoid, because this procedure removes that portion of the bowel which experience has shown is most apt to harbor polyps. They consider that many so-called recurrences are not true recurrences but new carcinomata arising from polyps left behind.

In H. F. Graham's case (*Am. J. Surg.* 5:234 (Sept.) 1928) a colitis associated with dysentery lasted 6 weeks, and was followed by chills, fever, rapid pulse, leukocytosis, and high polymorphonuclear count, and the development of multiple polyps in the colon, which later degenerated in 2 places into adenocarcinoma. Re-



lief followed a total colectomy done in multiple stages

**DIAGNOSIS**—Eickenbusch (Fort-schritte a d Geb d Rontgenstrahlen 36 662, 1927), in the diagnosis refers to the satisfactory demonstration of intestinal polyps after Fischer's method, by injecting air along with a small quantity of the enema

K G Kling's patient (Upsala Lakaref Forh 34 307 (June 16) 1928) aged 67, had colicky pain in the abdomen for a year, which became intense and localized in the region of the sigmoid, and was accompanied by diarrhea. While the diagnosis was chronic colitis, necropsy showed the inside of the large intestine, from the ileocecal valve to the anus, covered with polypoid formations of hazel nut size which proved to be myomas situated in the mucosa and originating from the muscularis mucosæ

**TREATMENT**—X-ray therapy is of no value and, according to Hullsiek (*loc cit*), the treatment has not been standardized. The mortality is high—47.2 per cent under all forms of treatment

**LEIOMYOMA**—A leiomyoma of the colon, growing from the ascending colon, reported by Wolfer (Surg, Gynec and Obst 47 643 (Nov) 1928) was 13 cm in diameter and weighed approximately 1050 Gm (2¼ pounds). The ascending colon and cecum were resected and the terminal ileum was anastomosed to the hepatic flexure by lateral anastomosis. While the smooth muscle tumors of the intestines are not common, they occur frequently enough to be considered in the differential diagnosis of abdominal tumors and of intestinal obstruction and especially

intussusception. The attacks tend to be spontaneously relieved only to recur again from time to time. Moreover, they must be considered in the differential diagnosis of large, fixed, ulcerating and obstructing growths of the rectum

**LIPOMA**—A submucous lipoma of the colon, removed under the diagnosis of carcinoma, is reported by J A MacFarlane (Arch Surg 17: 627 (Oct) 1928). According to Moore, only 6 cases were found in 44,654 operations performed at the Mayo Clinic

**COLOR BLINDNESS.**—Anomalies of color vision are of sufficient importance, according to Mériqot de Treigny (Paris méd 18 343 (Apr 14) 1928) to receive thoughtful consideration. These disturbances are important to those who must judge the differences in shade, and to those engaged in occupations where the differentiation between red and green is necessary. As pointed out by H Oioz (Rev Clin de Bilbao (Oct) 1927) changes in the color sense may be acquired or congenital. Acquired changes may be caused by lesions of the optic pathways, the retina, and even the cerebral cortex. The red-green function is the most delicate and for this reason is usually first affected. Later yellow-blue may be affected. Among the ocular diseases which may cause changes in color vision retrobulbar neuritis, chorio-retinal lesions, and detachment of the retina are exceedingly important. The congenital anomalies are sometimes difficult to interpret. Most common among these is blindness for red, and next in order blindness for green and violet. Subjects whose

color sense is weak sometimes have no difficulty in good illumination but cannot differentiate when illumination is reduced. Blindness for red and green is a very common anomaly, affecting 4 per cent of men and 0.4 per cent of women.

The importance of normal color perception is stressed by J. C. Siggins (Weekly Roster and Medical Digest 19 (Sept 22) 1928). Innumerable tests have been devised for detecting color defects, but for practical purposes, Siggins states that only 3 are necessary, the lantern occupying the first place, as much of a railroad man's and subway motor-man's life is spent in observation of colored signals. The next is the plate test, colored numbers on a colored background, the one by a Japanese physician, Ishihara, being in his opinion, the best. The skein test is also very useful, consisting of many colored wools which the examinee picks and matches from a group.

In all cases of accident it would be well to have the offending party examined in vision and colors, be he engineer, auto driver, or boat lookout. With a million defectives on our roads, color problems assume a new importance, and with the advent of a new era in airship transportation, with its tremendous speed, colors will probably play a great part in directing their movements.

The importance of the accurate perception of red and green is fully appreciated in navigation, in railroad-ing and in aeronautics, why this subject is neglected in certain other methods of travel is a matter for investigation, for example, in the case of the motorist.

**CONJUNCTIVA.—FOREIGN BODY (CATERPILLAR HAIR—OPHTHALMIA NODOSA)**—A 12-year-old boy was seen by R. F. Moore (Brit J Ophth 13 57 (Feb) 1929) 2 weeks after a playmate had struck him in the right eye with a caterpillar. The eye was intensely inflamed and the anterior chamber was one-quarter full of pus. The cornea did not stain and the pupil dilated freely. Three hairs were visible, deeply embedded in the cornea. An incision in the cornea to remove them rendered them invisible. No hairs were seen in the conjunctiva, and no nodules appeared at any time.

Over a period of 5 weeks there was gradual improvement, the hypopyon disappeared, and the vitreous opacities decreased. Slit-lamp examination revealed many more hairs, but no barbs could be made out. Three and a half months later the eye was white and vision was 6/6.

These cases are occasionally seen and there is usually a marked immediate improvement followed by the recurrence of severe inflammation in a few weeks. Typical gray or yellowish nodules from 1 to 2 mm in diameter occur in the ocular conjunctiva. Serious impairment of vision may result, but in none of the 8 cases reviewed was the eye lost.

**PIGMENTATION (ARGYROSIS) TREATMENT**—Argyrosis of the conjunctiva and its successful treatment are reported upon by M. F. Weymann (J A M A 93 1367 (Nov 2) 1929). It is not an uncommon condition and usually follows prolonged local medication with *silver nitrate* or *colloidal silver* compounds, principally *mild silver protein*.

The technic of his method of treat-

ment is as follows. Using sterile water and sterile bottles, one should first make a 12 per cent solution of sodium thiosulphate and a 2 per cent solution of potassium ferricyanide, not ferrocyanide. The solutions are not further sterilized. The conjunctiva is cocaineized with a 5 per cent solution, and epinephrine is instilled. Two parts of ferricyanide solution are mixed with 1 part of thiosulphate solution, and from 0.6 to 0.9 c.c. (10 to 15 minims) is drawn into a 2-c.c. syringe with a number 26 platinum needle. The solution is injected as superficially as possible under the pigmented conjunctiva, the needle point being moved to as many different areas as possible while the fluid is being injected. After withdrawal of the needle, the bleb should be massaged thoroughly through closed lids. The injections are repeated wherever the pigment is most dense. In areas in which 2 injections overlapped, there was some further clearing on the second injection.

The writer concludes by emphasizing again the danger of argyrosis from the prolonged use of mild silver protein and the colloidal silver solutions.

**PIGMENTATION (NEVUS).—**F. H. Rodin and E. M. Hall (*Am J Ophth* 12:24 (Jan) 1929) describe a case of pigmented nevus of the bulbar conjunctiva occurring in a boy aged 6. It had been first noticed a year previously, and had grown considerably during the year. The nevus was removed by operation, and a year later no recurrence had been detected. Pathological examination of the removed tissue showed pigmented cells of connective tissue arranged in small groups immediately below the epithelium, these cells were of the stel-

late type (chromatophores). These pigmented nevi of the bulbar conjunctiva may become malignant in early middle age, and should be removed.

**CYST.**—E. Wolff (*Proc Roy Soc. Med. (Sec Ophth.)* 22:4 (Nov.) 1928) reports the case of a man of 60 years who gave a history of having been hit in the right eye 5 years before. Two years later a swelling began at the site of the wound and steadily increased in size. On examination, there was found a cystic translucent swelling which protruded between the eyelids and prevented their closure. The whitish scar of the original injury could be seen in the conjunctiva near the cornea. The cyst was excised and found to lie between the conjunctiva and the sclera. On microscopic examination the wall was seen to be lined by several layers of squamous epithelium.

**PTERYGIUM.**—On the shores of the Mexican Gulf, local conditions, such as wind, heat and sunlight, seem to further the prevalence of pterygium. Under the influence of ignorance, neglect, and the use of patent medicines, A. F. Alonso (*Gac méd de México* 59:56 (Feb) 1928) states that the condition often assumes a serious form and even causes blindness.

**OPERATIONS—Conjunctivoplasty.**—In E. Szokolik's (*Am J Ophth* 11:438 (June) 1928) technic for conjunctivoplasty a triangle of conjunctiva is excised so that when the flap is drawn across the wound and sutured the 2 raw surfaces will come in contact. The method is illustrated by means of several sketches.

**TUBERCULOSIS.—DIAGNOSIS.**—E. Bartos and M. P. Motto (*Am J. Ophth* 2:533 (July) 1928) are con-

vinced that many cases diagnosed as Parinaud's conjunctivitis would prove to be cases of tuberculosis if they were more carefully studied. In the case reported in this article there was a rise in the temperature, the tuberculin reaction was marked, a guinea-pig injected with scrapings from the lesion developed tuberculosis, sections of tissue showed red-staining bodies resembling tubercle bacilli, and the histological picture was definitely that of tuberculosis.

**CONJUNCTIVITIS.—CHRONIC.—TREATMENT**—A Gutmann (Strahlentherapie 31 322 (Jan) 1929) describes a new lamp with which he has obtained good results in the ultraviolet treatment of chronic conjunctivitis and superficial diseases of the cornea.

A de Capite (Pediatrics 36 225 (Mar 1) 1928) publishes brief details of 31 cases of conjunctival and corneal affections in children, treated by injections of 5 cc of whole blood into the gluteal muscles. Improvement showed itself in the rapid disappearance of irritation, photophobia, blepharospasm, and corneal infiltration. No general reactions were observed after the injections.

**DIPHThERITIC —TREATMENT**  
H Ehlers (Ugeskr f Laeger 90 823 (Aug 23) 1928) describes 6 cases of diphtheria with diagnosis based on the presence of diphtheria bacilli in the affected conjunctiva. In the 5 cases observed from the start a simultaneous diphtheria in the nose or nose and throat was demonstrated. Two cases were without false membrane. The most constant and in some respects the most characteristic symptom was a swelling of the

eyelid. He suggests 40,000 antitoxin units intramuscularly in conjunctival diphtheria affecting the tarsus and the fornices in adults and children over 10 years, and also 16,000 units intravenously when the infection extends to the eyeball, with correspondingly smaller doses for younger children and with due regard to simultaneous diphtheria elsewhere in the patient. Local treatment also is advocated.

**GONORRHEAL — TREATMENT**  
—After reviewing non-specific foreign protein therapy in general, I I Muskat (Am J Ophth 2 539 (July) 1928) reports his experiences with intragluteal injections of boiled milk in 6 cases of gonorrheal ophthalmia in infants and adults. In 4 cases there was an associated vaginitis or urethritis. Local treatment had been given only in 1 case of bilateral ophthalmia neonatorum and 1 case of unilateral conjunctivitis without genital infection. The injections of boiled milk were followed by marked amelioration of the symptoms after 24 to 36 hours and a cure after 3 to 6 days.

E B Heckel's (J A M A 92 1582 (May 11) 1929) treatment of gonococcal purulent conjunctivitis consists of douching with cold physiologic salt solution, repeated every 6 hours, day and night, and followed by the application of iced compresses. Smears are made daily for bacteriological examination. The eyes are usually restored to normal after 48 to 72 hours.

**GRANULAR (TRACHOMA) — ETIOLOGY**—In an investigation to determine the cause of trachoma, H Noguchi (J Exper Med (supp no 2) 48 1 (Aug 1) 1928) used material

obtained from untreated well-advanced cases of trachoma in students attending the Government School for Indians. The ordinary bacteria isolated and cultured on various media did not induce trachoma when directly inoculated into the lids of monkeys, a chimpanzee, or an orang-outang, but an associated bacterium, designated by Noguchi as "bacterium granulosus," caused a persistent granular conjunctivitis which closely resembled and was apparently identical with trachomatous granular conjunctivitis in man and was followed by a spontaneous infection of the eye not injected.

The next step in the investigation was to determine the possibility of direct transference of the disease from monkey to monkey. Attempts at such transference were successful in 21 cases, doubtful in 1 case, and unsuccessful in 1 case.

The bacterium granulosus can be recovered from inoculated animals and has been found in microscopic examinations of monkey and human tissue.

From these determinations the author concluded that the *bacterium granulosus* is the inciting agent of trachoma in man and of granular conjunctivitis, the analogous condition, in monkeys.

[Several important investigations are now being undertaken which should at least prove or disprove Noguchi's claims. Other investigators have previously carried out similar studies but no unanimity of opinion in regard to the etiology of trachoma exists today.—Ed.]

H. Noguchi (Arch Ophth 56 423 (Sept) 1927) showed that material removed from the conjunctiva of

known cases of trachoma was injected subconjunctivally into monkeys without producing any reaction. When the same material was cultured on ordinary media, a growth of staphylococcus, bacillus xerosis (a sarcina-like organism), and a small motile Gram-negative bacillus was obtained. None of these produced trachoma-like lesions in monkeys. The active organism was found to be a small pleomorphic bacilliform organism which was motile only under certain conditions and grew on a semisolid medium containing fresh animal serum and hemoglobin. Of 12 monkeys inoculated with this organism, a trachoma-like inflammation resulted in all but 1. In 1 animal, scar formation began 7 months later. Three recovered after having conjunctivitis for about 3 months. In some, the disease was transmitted spontaneously to the uninoculated eye. It was possible to transmit the disease also to other monkeys by inoculation.

Pathologically the disease closely resembles the human variety, especially in species of monkeys which have loose subconjunctival tissue. The follicles are characteristic, dark-staining lymphocytes in a laminated periphery with lighter centers of mononuclear vesicular cells, often capsulated. So-called Villard's phagocytes and mitosis are common in the central area. This is the first instance of trachomatous infection in animals produced directly from cultures.

**TREATMENT**—L. Ragain (Paris méd 1 406 (Apr 27) 1929) reports good results in the treatment of trachoma by **high frequency currents**. Special wooden insulating lid retractors were used. He considers monopolar fulguration the method of choice.

because it is almost painless and causes but a slight local reaction, whereas diathermocoagulation and the bipolar hot spark method are painful and cause a strong local reaction (with edema of the lids, congestion of the conjunctiva and intense lacrimation), which lasts from 2 to 12 days. The results (destruction of the granulations and thin supple scars) are equally good in all 3 methods. Two or 3 days after the treatment, the local application of ointments with a copper base is prescribed to prevent the recurrence of the granulations and, if they do recur, another light fulguration treatment is indicated.

In considering practical points in the treatment of trachoma, D D McHenry (J A M A 93 1291 (Oct 26) 1929) concludes that trachoma is curable in 99 per cent of cases. It is not often, if ever, entirely cured in the chronic stage by the use of drugs alone. This failure is partly due to the fact that it is impossible to keep the patient coming and submitting to such painful treatment for a sufficient length of time.

Any surgical procedure that will entirely eradicate the trachoma follicles and their contents with minimum destruction of normal mucous membrane is adequate, according to McHenry (*ibid*). In the great majority of well advanced cases of trachoma the caruncle is involved and must be included in surgical procedures if successful results are to be obtained. He has found that most chronic cases show hypertrophy of the orbicularis muscle with blepharophimosis, and a radical canthoplasty should precede other operative procedures.

Tarsectomy has no place in the

treatment of active trachoma but is a valuable procedure in cured or nearly cured cases in which the lids are thickened and distorted.

McHenry states, however, that surgical procedures alone will result in cure in only a small percentage of cases of trachoma unless follow-up examinations are made for 1 to 2 years, any follicles that may appear during that time being watched for and destroyed.

**MEMBRANOUS**—C W Rutherford (J A M A 93 1779 (Dec 7) 1929) has reviewed the literature on membranous conjunctivitis and adds 2 cases. He concludes that the condition of membranous exudation on the conjunctiva is only a symptom usually of some general disease in which the ophthalmologist may have a consultation interest, or of an infection within the orbit in which he has a surgical responsibility. Membranous exudates are intercurrent conditions which cannot be originated by injuries or organisms alone. A predisposition or susceptibility must be present. This can result from an injury, slight or severe, a local inflammation in the incubation, active or convalescent stage, or a general disease which has lowered the patient's resistance to a new infection. To the predisposition must be added organisms that are capable of doing harm. Membranous exudates of relatively short duration occur in some cases of diphtheria, they also occur in a recurrent form of prolonged duration, especially if streptococci are present. Frequently both eyes are affected. The principal complication is ulceration of the cornea with intraocular infection and loss of vision, if not loss of the eyeball. Treatment for the re-

current variety is usually without effect

**ETIOLOGY**—D T. Vail, Jr (Am. J Ophth 11 782 (Oct) 1928) reports a case of membranous conjunctivitis in a boy 14 months old which was caused by the injudicious use of strong solutions of *silver nitrate*. When the child was a month old a mucopurulent secretion occurred in the right eye with formation of a membrane on the tarsal conjunctiva. Six months later the left eye became similarly involved. Silver nitrate solutions varying in strength from 2 to 5 per cent were used for months. An ulcer formed on the left eye which, following Saemisch section, became phthisical. As diphtheria bacilli were found, diphtheria antitoxin was given. On 3 occasions all granulation tissue and fibrous exudate was removed down to normal tissue. One radium treatment was given and resulted in a burn on the cheek.

Following an examination of tissue removed by Vail, Verhoeff reported that the brownish pigment granules were precipitated silver.

**PHLYCTENULAR—ETIOLOGY**—Phlyctenular conjunctivitis and keratitis of nasal origin have been reported by Worms and Bidault (Paris med (Apr 7) 1928). Phlyctenular keratitis and adenoids are often associated in infants. Many cases of kerato-conjunctivitis in adults are secondary to inflammation of the nasopharynx.

H Casparis (Am J Dis Child 34 779 (Nov) 1927) reports that all of his patients with phlyctenular kerato-conjunctivitis reacted to tuberculin intracutaneously. Usually they showed a minimal amount of tuberculous involvement elsewhere. Eye symptoms

in every instance began to clear immediately when treatment by desensitization to tuberculin was begun. Response to extraordinarily small amounts of tuberculin was marked. Exacerbations in eye symptoms in some instances occurred during the course of desensitization, apparently as the response to an overdose of tuberculin. Tuberculin treatment offers protection against recurrence of attacks for a sufficient length of time to procure through general measures the arrest of the underlying tuberculous focus. The peculiar incidence of phlyctenular keratoconjunctivitis may be explained by assuming that those who manifest the disease belong to that group of individuals who are hypersensitive to some "foreign protein."

Casparis concludes that phlyctenular keratoconjunctivitis is in all probability a local manifestation of hypersensitiveness of the patient to tuberculin and a tuberculous focus somewhere in the body is the underlying etiological factor. This manifestation can readily be made to disappear by at least partially desensitizing the patient to tuberculin.

**DIAGNOSIS**—Variations in the clinical manifestations of a common affection, phlyctenular disease, are described by L W Fox (Amer Med 35 605 (Sept) 1929). In the typical case, the affected eye shows 1 or more well-defined discrete lesions about the size of the head of a pin or larger on the cornea, at the corneal margin, or on the globe beyond the corneal limbus. The lesion, as is well known, is called a "phlyctenule" and suggests a pimple, a blister, papule, or a pustule, but the course pursued by such on the skin is not followed by the

lesion on the conjunctiva or cornea by reason of the heat, moisture and friction of the lids, always present in this location

**PROGNOSIS**—The natural outcome of every case of phlyctenular disease is resolution, according to Fox (*ibid*), but it may prove disastrous to the transparency of the cornea, and proportionate loss of vision will follow

**TREATMENT**—Fat deficiency may be a factor in the etiology, hence means must be taken to overcome this, and while milk, cream, and butter are advised in abundance, they may not be tolerated. Plain **cod-liver oil** is a valuable adjunct not only by reason of its fat but on account of its iodine content. Any fresh cod-liver oil is good and the repugnance to it may be avoided by beginning its administration with very small doses at short intervals. A dry cracker afterwards removes the taste from the mouth. **Syrup of hydriodic acid** in teaspoonful doses 3 times daily is a valuable part of the internal medication, although at times the **syrup of the iodide of iron** may be preferable. All these patients are anemic even though at times apparently fat and rugged.

**Fresh air, sunshine, and the seashore** are very essential. From this and the foregoing it readily appears that the treatment for early tuberculosis is readily applicable to this affection, thus confirming the belief entertained in many quarters that it is a pretubercular or even a tubercular condition.

Locally the physician must be guided entirely by the symptoms. The presence of a pustular condition of the face will call for the **removal of the crusts** and the application of some mild antiseptic such as **ammoniated**

**mercury** in ointment form. Usually this is employed in the strength of from 0.3 to 0.6 Gm (5 to 10 grains) to 30 Gm (1 ounce) of petrolatum. **Fissures** at the angles of the mouth or canthi require the application of **nitrate of silver** in varying strengths in solution, and sometimes in the **solid stick**. The weak solution should be given a fair trial first. If the *spasm of the eyelids* is severe it must be broken even if general anesthesia is required for this purpose. In practice 1 thorough **stretching of the lids** by means of lid retractors makes subsequent opening of the lids comparatively easy. As a rule corneal ulceration will be exposed when the spasm is broken, but occasionally the cornea will be perfectly clear. **Noviform ointment** (3 per cent) which is a refinement of iodoform, either alone or combined with **atropine sulphate**—0.06 Gm (1 grain) to 8 Gm (2 drams)—should be applied directly to the eye. Watery preparations are not so well borne in these cases as those in ointment form. Atropine is a remedy in this condition but its use is not so imperative if there be no corneal ulceration.

Pronounced *ulcers* may call for the application of **trichloroacetic acid, iodine, carbolic acid**, or even the **electro-cautery**. Such cases properly belong in the domain of ophthalmology.

**Atropine** and dark glasses should be ordered for every case showing *photophobia*. Bandages should be avoided.

**PARINAUD'S —DIAGNOSIS—**  
C. D. Verry and K. T. A. Halbertsma (Brit J Ophth 12:79 (Feb) 1928) report 2 cases of a condition which closely resembled Parinaud's conjunctivitis except for the blood picture. The onset was relatively acute,



with homolateral glandular involvement, elevation of the temperature, and enlargement of the spleen. Histological examination yielded findings resembling those described by Morax and Verhoeff. No micro-organism was discovered.

**STAPHYLOCOCCUS (NEONATORUM)**—A B Thomas (J Infect Dis 43 306 (Oct) 1928) asserts that an acute purulent conjunctivitis may occur in infants without evidence of a preexisting vaginitis in the mother. In 100 consecutive cases of purulent conjunctivitis of the newborn, none appeared to be caused by the gonococcus. Culture of *Staphylococcus aureus* isolated from the conjunctivæ and some other lesions that were present seemed to belong to a single strain and were atypical in staining qualities, metabolic reactions with carbohydrates, and pathogenicity for animals. This organism was considered to be the causative agent in all the cases and was probably transmitted through contaminated olive oil or boric acid or both.

**CONVULSIONS**—While a convulsion is only a symptom, it is sufficiently important to be considered under a separate heading.

**CLASSIFICATION**—Etiologically, convulsions may be classified under 5 headings: (1) *metabolic* or *chemical*, (2) *idiopathic*, (3) *toxic*, (4) *organic* and (5) *reflex*. (G Chown Canad M A J 17 191 (Feb) 1927). The *metabolic* or *chemical* type is known clinically as tetany or as spasmodophilia. Tetany, while constituting a definite clinical picture, has come to be looked upon, not as a disease *per se*, but rather as a symptom-complex, occurring under various condi-

tions and arising as a result of the most varied causes.

**TYPES OF TETANY.**—The clinical types of tetany are numerous, according to W R Shannon (Arch Pediat. 46 346 (June) 1929), but they may be condensed into 4 groups: (a) infantile tetany, (b) that due to disturbed acid-base equilibrium (gastric tetany, tetany due to excessive aeration, and to excessive intake of sodium bicarbonate), (c) transitory environmental or accidental tetany, such as occupational and epidemic tetany of pregnancy and of acute diseases, (d) tetany due to decreased parathyroid function—post-operative and idiopathic varieties.

*Infantile tetany* is the most common and consequently the most important form of the metabolic or chemical type of convulsions. In this, the characteristic chemical finding is, of course, a lowering of the blood calcium. Infantile tetany or spasmodophilia, according to H J Gerstenberger, J I Hartman, T Wilder and D N Smith (Tr Am Pediat Soc 39 51, 1927), is a form of rickets which has experienced a peculiar type of healing as a result of the action in some manner of interrupted treatment.

The definite predisposing part of the *ser* factor in tetany is emphasized by H Bakwin and Ruth M Bakwin (Am J Dis Child 35 964 (June) 1928), who demonstrated that the condition was more than twice as common in boys as in girls. The age incidence lies between 6 and 18 months, although cases have been reported in infants and young children well beyond both of these limitations. J Ahlmann (Acta paediat 8 204, 1928) reported a case of tetany in a 5 year old child and H Schlack

(Monatschr f Kinderh 40 89, 1928) in a girl 6 years of age. Possibly 1 or both of these cases should be classified under the idiopathic type of convulsion.

*Hypoglycemic convulsions* should also be included under the heading of the metabolic or chemical form. The presence of this type of convulsive state has but recently been emphasized. H. Joseph (Am J Dis Child 31 169 (Feb) 1926) demonstrated that short fasting periods were capable of producing convulsions in children, especially of that type seen at the onset of acute infection. Studies indicated that these convulsions were probably hypoglycemic in origin. Joseph also called attention to the close association of this type of convulsion with the attack of recurrent vomiting. J. P. C. Griffith (J A M A 93 1526 (Nov 16) 1929), from a study of a group of patients, found evidence of a close connection between this disorder and the existence of a low blood sugar. Whether there is an etiologic relation, he could not determine from his investigations. It was also discovered that a low blood sugar may exist without the occurrence of convulsions. Griffith feels that at least in some instances there is a causative relation of hypoglycemia to convulsions.

**IDIOPATHIC HYPOPARATHYROID TETANY** is probably closely related to those types comprising groups 1 and 3. According to F. Talbot (Clin Pediat 13 72, 1928), the condition is rare in childhood. The clinical picture in this *puerile* form of tetany does not differ essentially from that of the adult form. Instead of the obstetrical posture of the hand seen in infantile tetany, a fist posi-

tion may be assumed, or, in children especially, the fingers may be spread. *Age* does not seem to be a predisposing factor and *sex* is only a questionable one. The *seasonal* influence is similar to that of the infantile form. Infections apparently act as exciting agents, while a diminution in function of the parathyroid glands seems to be the basis of the symptoms (Shannon *loc cit*).

**IDIOPATHIC EPILEPSY**—The *incidence* of epilepsy in the United States has been estimated to be about 1 in every 300 persons (C. J. Borka M Clin North America 12 1639 (May) 1929). The *etiology* of epilepsy is not well understood. There is a wide difference of opinion concerning the significance of convulsions occurring during infancy and early childhood, some authors maintaining that such reactions are of only passing importance, while others believe they may portend a later epilepsy. The formation of this convulsion habit may be by a method similar to that of the formation of any habit, the nervous system responding more easily to certain stimuli (W. T. Shanahan Am J Psychiat 7 591 (Jan) 1928). E. Faerber (Jahrb f Kinderh 42 148, 1929) claimed that fever convulsions closely resembled epileptic ones. Children manifesting attacks of this type may be divided into 2 groups, the one in which subsequent development is normal, and the other, in which epilepsy may later develop. According to D. A. Thom (Am J Psychiat 6 613 (Apr) 1927), there is reason to believe that if infantile convulsions associated with rickets, gastro-intestinal upsets and acute infections were looked upon more seriously and a greater effort

was made to prevent their occurrence, much epilepsy and mental deficiency might be prevented

D M Levy and H T Patrick (Arch Neurol and Psychiat 20 443 (Sept) 1928) reviewed the records of 500 patients with epilepsy for the purpose of noting all recurrent attacks other than migraine and infantile convulsions preceding the true seizure, and of determining, if possible, the relation between the two conditions. It was found that 64 of the patients had a history of recurrent attacks of such symptoms as dizziness, trembling, queer feelings, hot flashes, and the like, which preceded the onset of epilepsy for periods varying from 1 week to about 40 years

**Diagnosis**—As so many factors must receive consideration, there is much discussion as to the age when it is possible to diagnose epilepsy. It can be diagnosed more readily in early life if an hereditary history is obtained, or if there is an evident organic basis present (Chown *loc cit*)

J Fetterman (Arch Neurol and Psychiat 20 1330 (Dec) 1928) has found the *hyperpnea test* of value in the diagnosis of epilepsy. This is carried out by instructing the patient to breathe deeply at the rate of 12 times a minute. In the epileptic patient, muscle quiverings, sometimes spasm of the fingers, and occasionally generalized convulsions may occur. This test is not as reliable in children as in adults.

One must have some idea as to what characterizes an epileptic convulsion. <sup>tra</sup>ntreq will be in danger of confusion, because convulsive seizures with it. <sup>adequate in</sup> <sup>sure, to be epi-</sup> <sup>ay</sup> The treatment

leptiform, must be transient, must impair or cause loss of consciousness, and must ultimately result in some change in the personality or the mentality of the patient. For a number of years it has been evident that epilepsy is a manifestation of disease and not a distinct entity. More recently the term "*convulsive state*" has been introduced to replace the time-worn term "epilepsy" with its restricted connotation. By the newer term is meant a paroxysmal disorder of clonic or tonic muscle spasm, involving larger or smaller segments of the entire body.

**Pathogenesis.**—While pathologic changes in the central nervous system of the epileptic patient have been described from time to time, the general opinion held at present is that these are the result of a long continued process, and are not the cause of the convulsions. The convulsive state probably is brought about by (1) a group of poisons operating upon the cerebral vascular system producing anemia and then congestion, (2) by local cerebral disease or a disturbed vascular condition, upsetting the vascular equilibrium, or (3) by a combination of the two (S Brock Arch Neurol and Psychiat 20 420, 1928). For additional discussion of pathogenesis of epileptiform convulsions, see EPILEPSY.

**TOXIC CONVULSIONS.**—The term "toxic" is employed in a wide sense to indicate both poisonous substances introduced into the body from without, and those generated in the body. In the former class, among other conditions, is found the toxemia of pregnancy. An infant born of an eclamptic mother may suffer from fatal convulsions, or an infant being nursed by an

eclamptic woman may absorb the toxins from her and develop convulsions (Chown *loc cit*) R Waitz (Rev franç de pédiat 5 171 (Apr) 1929), however, feels that disease of the mother during pregnancy plays only an unimportant rôle in the etiology of convulsions in the new-born. In the second group, that of toxins generated within the body, are included those seizures arising from such conditions as acute infections, acute indigestion and the like. Convulsions are not infrequently associated with enlargement of the thymus gland. The mechanism by which these convulsions are produced, however, is not known, they may be toxic, metabolic or reflex in origin.

**ORGANIC CONVULSIONS**—In the new-born, convulsions are rarely toxic, but are frequently organic in origin. This is due to the great opportunity for traumatic injuries associated with intracranial hemorrhage, and to the prevalence of congenital defects (Chown *loc cit*) R Waitz (*loc cit*) found that obstetrical factors rendering child-birth more difficult and the infant less resistant, were common causes of convulsions of this age period. Of the infectious causes, syphilis, while an etiologic agent, is not so important a factor as it is sometimes stated to be. P Nobecourt and L Lebée (Bull Soc de pédiat de Paris 26 24 (Jan) 1928) asserted that syphilis, although twice as prevalent in children with convulsions as in other children, should not be considered predominant in the etiology of convulsions in infants.

**SPINAL FLUID IN CONVULSIONS.**—The amount and pressure of cerebrospinal fluid is always increased during a convulsion regard-

less of the cause of the seizure. The presence or absence of chemical and cytologic changes will depend upon the cause of the convulsion (A Levinson Am J Dis Child 36 799 (Oct) 1928).

**PROGNOSIS**—There seems to be no prognostic value to the pathologic, physiologic or psychologic factor with which the first convulsion is associated. Those cases in which the convulsions occur without any apparent exciting factor are invariably more significant, and the prognosis should be more guarded than in those associated with a definite exciting agent (Thom *loc cit*) H Naujoks (Monatschr f Geburtsch u Gynak 80 297 (Nov) 1928) concluded that after children have lived through the first disturbance caused by intracranial hemorrhage, some of them never present any physical or psychic abnormalities. Some die of direct or indirect consequences of intracranial hemorrhages (convulsions). Little's disease and psychic changes are never observed following intra-cranial hemorrhages, according to this author.

**TREATMENT**—Immediate—For the average convulsion the patient, if the temperature is not elevated, should be placed in a **mustard bath** at a temperature of 105° F (40.5° C) and **brisk friction** applied to the **trunk** and **extremities**. When the convulsion is associated with hyperpyrexia, a **cold bath** or **pack** should be substituted, and a **rectal irrigation** given. If the attack is severe, and is slow in responding to treatment, **chloroform** may be administered in a quantity sufficient to control the attack. In the meantime, the **bowels** should be **emptied**, and **breasts** were looked **aloral** given by rectum and a greater. The

medication should be repeated at regular intervals as long as signs of nervous irritability are present. For frequent recurring convulsions, **magnesium sulphate**, subcutaneously, is effective in doses of 0.5 to 0.6 Gm (8 to 10 grains), for infants from 3 to 4 months of age, 1 to 1.3 Gm (15 to 20 grains) for 1 of 6 months. **Oxygen** is indicated in convulsions due to asphyxia. The therapeutic value of **lumbar puncture** for convulsions recurring over a period of several hours, is doubtful, but it should be tried. The *after-care* of the patient consists in putting the child in a quiet, darkened room, with an ice cap applied to the head, and liquid diet of orange juice or 10 per cent glucose solution is recommended. (Chown, *loc cit*.)

**TETANY**—**Irradiated ergosterol** administered to 3 cases of tetany by M. Gleich and S. Goodman (New York State J Med 28 1398 (Dec 1) 1928) not only promptly controlled the convulsions, but, within a few days, produced marked increase in blood calcium. H. Bakwin, Ruth M. Bakwin and Gertrude Gottschall (Am J Dis Child 37 311 (Feb) 1929) found that of a group of agents which exert a lasting effect on the clinical manifestations and the serum calcium of infants with tetany, irradiated ergosterol, 4 mg ( $\frac{1}{16}$  grain) a day, was the most rapid in its effect. The symptoms soon disappeared and the serum calcium returned to normal within 7 days. This was in contrast to the results obtained with ultra-violet irradiation, which treatment required 14 days. Cod-liver oil, alone, because of its slow action, is inadequate in the treatment of tetany. The treatment of choice, for

infants with tetany, seems to be the combination of **calcium chloride** and **irradiated ergosterol**. H. J. Gerstenberger and J. L. Hartman (J A M A 92 367 (Feb 2) 1929) gave weekly **ultra-violet quartz lamp** treatments. The dosage employed was a 1 erythema unit as determined by the method of Rost and Keller. This amount of exposure was given to the front and back of the body of colored children, and a smaller dose over the same areas, to white children. The authors secured practically the same results as are obtained by the heavier dose of ultra-violet light at present in general use.

**Parathyroid Hormone Treatment.**—A. Hoag and Helen Rivkin (J A M A 86 1343 (May 1) 1926) observed rapid disappearance of symptoms and signs and a prompt return of the serum calcium to normal when they treated cases of infantile tetany with subcutaneous injections of parathyroid extract—Collip. It was felt that a safe tentative dose was about 5 units of parathyroid extract per kilogram ( $2\frac{1}{2}$  pounds) of body weight for each desired rise of 1 mg of serum calcium, the total amount to be distributed over a period of from 24 to 36 hours, at 4 to 6 hour intervals. F. Albright and R. Ellsworth (J Clin Investigation 7 183 (June) 1929) obtained excellent results with this form of treatment in a case of *idiopathic hypoparathyroidism* occurring in a 14 year old boy. The symptoms returned, however, in 1 week after the treatment was discontinued.

**EPILEPSY**—**Treatment**—**Ketogenic diet** should be thought of as a form of treatment to be employed quantitatively in selected cases rather than as a proved specific remedy to

be tried in all cases of epilepsy (C Barborka *loc cit*) H F Helmholtz (J A M A 88 2028 (June 25) 1927), after 5 years of experience with ketogenic diet in epilepsy, found that 31 per cent of his patients were free from attacks and that 23 per cent were definitely improved. Some of the failures may be accounted for by inability to control the diet in the home. For additional remarks on treatment, see EPILEPSY.

**Apnea** as a treatment of epilepsy, has been suggested by J Fetterman (*loc cit*). On the basis that hyperpnea is conducive to convulsions, he concluded that apnea might prevent them. His epileptic patients were advised, upon the appearance of the aura, to exhale to the maximum and to hold the breath, at the same time keeping the arms and all the muscles of the thorax tense. Often the premonitory symptoms disappeared and the attacks did not develop.

**CORNEA — KERATOCONUS** —E Torok and L D Redway (Arch Ophth 57 19 (Jan) 1928) report 3 cases of keratoconus in which a very complete study was made with reference to endocrine function. All of them showed a slight decrease in the metabolic rate, areas of rarefaction in the cranial bones, and a decrease in the hemoglobin and cell count.

From these findings the authors conclude that hypofunction of the internal secretory glands and a change in calcium metabolism may be etiological factors in keratoconus.

The administration of thyroid extract was followed by improvement of vision although no changes in the characteristics of the keratoconus were noted.

**DEGENERATION OF THE CORNEA** —The case reported by C H Chou (Arch Ophth 57 574 (Nov) 1928) of a typical form of familial degeneration of the cornea was that of a woman 27 years old who complained of eyestrain. In each cornea there were many gray flake-like opacities with clear centers. On slit-lamp examination, these were found to be irregular in outline and to be formed of many dust-like particles. The nerves of the cornea were much more distinct than usual. All of the opacities were beneath the surface of the cornea, mostly in the stroma, under Bowman's membrane. The endothelium was normal peripherally, but showed early signs of degeneration in the central part of the cornea. The corneal sensibility was somewhat reduced, but the general physical examination was entirely negative.

**CYSTS** —Following a bilateral advancement operation performed by another surgeon, L W Fox (Brit J Ophth 12 249 (May) 1928) noted at the site of anchorage a V-shaped separation of the sclera extending into the cornea. A cavity had formed and was filled with fluid. In 1 eye the cavity was opened by the introduction of a keratome, and the fluid evacuated. Prompt recovery of good vision resulted.

**INFECTIONS** —Four cases of ring abscesses of the cornea following injury, in which the eye was eviscerated because of panophthalmitis, are reported by S R Gifford and C E Hunt (Arch Ophth 1 494 (Apr) 1929). Examination of smears and cultures showed *Bacillus subtilis* in 2 cases and an organism belonging to the subtilis group in 1 case. In the fourth case no bacteriological ex-

amination was made. In 1 case, histological examination revealed absence of the epithelium and endothelium. The infiltration was greatest in the middle layers of the cornea, particularly at the periphery.

In experiments on rabbits in which he injected cultures of virulent tubercle bacilli into the cornea, H. F. Newton (Arch Surg 18 1542 (Apr) 1929) found that when ultra-violet light treatment of the cornea was given before the appearance of macroscopic lesions, the cornea was sterilized and remained clear. Treatment of the cornea with the ultra-violet light after the appearance of macroscopic lesions resulted only in increased vascularity and infiltration. Irradiation of the body of the rabbit had no effect upon the local condition. All of the results were checked by microscopic examination.

**OPERATIONS**—A. M. Rosenstein (Wien klin Wchnschr 40 587 (May 5) 1927) records his experiences with the new method of *tattooing* the cornea with gold chloride.

The only instruments needed are a lid retractor, a foreign body needle, and a very small sharp spoon curette. The technic is as follows:

1. The epithelium of the entire corneal area to be tattooed is scarified superficially with the point of the foreign body needle or that of a Graefe knife.

2. A sterilized toothpick, wound at its blunt end with cotton, is then dipped in a freshly prepared 1 to 2 per cent solution of gold chloride, neutralized with sodium bicarbonate, and applied with slight pressure for 2 to 3 minutes to the abraded area of the cornea until a yellow discoloration appears.

3. The eye is then kept open from a few to 30 minutes and after that a 1:1000 solution of adrenalin is instilled, depending upon whether a light, medium, dark brown, brownish black, or black discoloration is desired.

## CORONARY DISORDERS.

See CARDIOVASCULAR SYSTEM

**CRYSTALLINE LENS.**—**CHEMISTRY**—C. L. Burky and A. C. Woods (Arch Ophth 57.464 (Sept) 1928) have demonstrated that lens protein is composed of 3 immunologically distinct fractions: alpha, beta, and gamma crystallin. The alpha and beta crystallins are pseudoglobulins, antigenically active, organ-specific, and lacking species specificity. The gamma crystallin is an albumin which is isolated from the beta crystallin. The beta crystallin must therefore be considered a beta gamma complex.

**ANATOMY AND PATHOLOGY.**—In an anatomical and pathological study of the crystalline lens, J. O. McReynolds (J. A. M. A 90 13 (Jan. 7) 1928) has examined 200 cataractous lenses extracted in capsule. His observation has led him to the conclusion that the zonula can be successfully ruptured without rupture of the capsule or the anterior hyaloid membrane, and the lens thus extracted in its entirety with considerable certainty in practically all patients after the age of 50.

**RETROLENTAL SPACE.**—The older textbooks describe the lens as being embedded in the fossa patellaris of the vitreous, with no space between the two but biomicroscopy has shown the presence of a definite postlental space about 1 mm deep and

filled with aqueous L W Morsman (Arch Ophth 1 594 (May) 1929) describes in detail the technic for observation of this space

The pathology of the retrolental space is that of the aqueous, but inflammatory signs appear first and are more numerous in the space He urges that a study of the retrolental space be made in all cases of uveitis, especially when sympathetic disease is suspected

**CYSTITIS.—CATHETER CYSTITIS** is a misnomer, according to H Cabot (J Indiana M A 21 1 (Jan) 1928), who believes that the technic of the surgeon, and not the catheter, is the essential factor in the production of the so-called catheter cystitis

In cases of reflex retention of urine, such as occurs after operation or severe injuries, the reflex mechanism of the bladder is temporarily deranged and although the bladder is known to be uninfected and the urinary tract normal, reflex retention and overdistention follow, the catheter is used and infection results in from 15 to 20 per cent of the cases

**TREATMENT** — Over-distention should be prevented The average normal capacity of the bladder is believed to be 10 ounces Routine emptying of the bladder should be done when this point has been reached Obviously this can not be accurately determined and can only be guessed at, but the surgeon should watch the second 6-hour post-operative period, rather than the third, and anticipate the development of over-distention If infection occurs when this plan is followed, it may be expected to disappear

**DELAYED SYPHILITIC CYSTITIS** — Ubaldo Isnaredi (Semana med 2 297 (Aug 2) 1928) treated a woman aged 36, giving a personal history of hepatic distress without icterus and dysuria The urine was turbid and bloody and contained glucose The husband had an infection of the aorta which was being treated with injections Examination of her urinary tract revealed a normal urethra, the capacity of the bladder was 60 c c, the mucosa was redder and more glistening than normal, and in the vicinity of the ureter the inflammation was very pronounced The Wassermann was positive Treatment with **neosalvarsan**, beginning with 0.15 Gm ( $2\frac{1}{2}$  grains), was followed by recovery

**PARACYSTITIS** — Broun (Chir Arch 40 (Nov) 1928) divides paracystitis into 4 groups (1) phlegmons of the rectus abdominis muscles and their sheaths, (2) phlegmons of the space of Retzius or preumbilicovesical paracystitis, (3) phlegmons of the paravesical connective tissue, and (4) inflammation of the retrovesical peritoneum, pericystitis

**ETIOLOGY** — General and local infections play an important part as grippe, osteomyelitis and infections of the pelvis, coxitis and catheterization

**PATHOLOGY** — There are 3 forms of paracystitis the congestive, the sclerotic, and the suppurative In the first, spontaneous resorption often occurs The 2 other forms lead to the formation of abscesses

**SYMPTOMS** — Chills, fever, difficulty in urination and pain in the hypogastrium, pain behind the symphysis and obstipation

**PHYSICAL SIGNS** — Tenderness and resistance above the symphysis



Cystoscopy and cystography yield valuable information which sometimes is decisive (evidence of rupture of an abscess into the bladder, edema, and infiltration of the bladder wall, etc.)

**Treatment** at first is **conservative**; later it should consist of **operative incision** and **drainage** if required

**SUBMUCOUS FIBROSIS** (Localized Cystitis)—Patients with this condition, according to W A Frontz (South M J 21 899 (Nov) 1928), give a history of long continued urinary frequency, associated with suprapubic pain on over-distention of the bladder

**SYMPTOMS**—Urinary frequency, even incontinence and pain. The pain, which is caused by distention of the bladder, is suprapubic and usually severe and cutting in character. In many cases there is a history of hematuria following over-distention of the bladder and noted only during a single voiding

**DIAGNOSIS**—Absence of urinary obstruction and no pathological elements in the urine. A reduction of the capacity of the bladder to between 100 and 150 cc or less. The area of reddening varies in diameter from a few millimeters to several centimeters. If the bladder is over-distended, the formerly intact mucosa covering the lesion may be the site of bleeding fissures

**PATHOLOGY**—The mucosa rests on a dense scirrhous layer instead of the normal loose areolar tissue. It is a fibrosis of the submucosa. When the deeper layers are involved the lesion is thick walled

**TREATMENT**—All foci of infection should be eradicated. **Extirpation** of the lesion in the bladder. **Deep**

**fulguration** under anesthesia may be tried before resorting to more radical surgical measures

**ALKALINE INCRUSTED CYSTITIS, URETHRITIS AND PROSTATITIS**—W M Kearns (J Urol 20 125 (July) 1928) reports a case from which *Bacillus proteus ammoniae* was isolated. The treatment consisted in **curettement** followed by instillations of 2 per cent **acetic acid**. In 2 other patients with ammoniacal urine and phosphatic incrustations of suprapubic fistulae, the introduction of a *bacillus bulgaricus* culture with **lactose** gave good results

According to A Pulido Martin (Siglo méd 82 521 (Dec 1) 1928), incrustations of calcium salts which tend to form around necrotic cells, usually occurring in women and the syphilitic, should be treated by **removing necrotic masses** and **concretions** and **cleaning** and **cauterizing** the surface of the ulcers by swabbing them with a mixture of **pure phenol** and **crystallized silver nitrate**, and by **acidifying** the urine. When the Wassermann is positive intense arsenical treatment gives the best results

**PYELITIS CYSTICA, URETERITIS CYSTICA AND CYSTITIS CYSTICA**—H D Morse (Am J Path 4 33 (Jan) 1928) observed 125 cases at necropsy and only 3 were recognized macroscopically. Serial sections were made at different levels in 15 cases and Aschoff was confirmed in his opinion that there was no duct connection between the cysts and the lumen. The author drew the following conclusions: (1) Glandular structures are not normally found in the urinary tract above the trigone of the bladder, (2) epithelial buds, cell nests and cysts are not normally

found in the urinary tract, (3) cysts of the urinary tract are formed from the epithelial cell nests of von Brunn, (4) the epithelial buds and cell nests are inflammatory in nature, (5) microscopically they are present in most people over 20 years of age, (6) there was no evidence to support the secretory theory of the cyst formation, (7) the cysts are formed by degeneration of the central cells of the epithelial nests

**GANGRENOUS CYSTITIS.**—F. S. Patch (J Urol 19 713 (June) 1928) reports 2 cases of gangrenous cystitis occurring in males, one with exfoliation of a complete cast of the bladder. A man 40 years of age was addicted to alcoholic excesses and was suffering from disseminated sclerosis and acute urinary retention, due to an old stricture resulting from gonorrhea. On his admission to the Montreal General Hospital, the patient was afebrile, toxic, and azotemic. Catheterization was performed regularly at 4 hour intervals, producing foul and bloody urine. An indwelling catheter was introduced, but tended to become plugged and forced out. The temperature gradually rose to 101° F (38.3° C), with an occasional rise to 103° F (39.4° C) and the urine remained foul and bloody. A **suprapubic cystotomy** was performed to secure adequate drainage. When the bladder was incised the urethra was found to be plugged by a soft veil of tissue which proved to be an almost complete cast of the bladder mucosa.

On the patient's discharge from the hospital he promptly resumed his alcoholic excesses. Two days later he was readmitted with marked azotemia, a cloudy mentality and incontinence of urine and feces. Under

treatment his condition improved. A cystourethroscopic examination revealed, behind the verumontanum, a markedly dilated pouch which was separated from the bladder by a diaphragm of tissue. Across the trigone there was a band of tissue fixed at either end. A cystogram showed a slight reflux of the right ureter.

A suprapubic fistulous tract was dissected out, the bladder opened, a sound introduced into the urethra and the diaphragm slit on the sound.

A subsequent cystogram showed bilateral ureteral reflux with distention of the ureters and kidneys and the same irregularity of the bladder that was noted before. Under **regular dilatations of the urethra**, the condition gradually improved and the suprapubic fistula closed permanently.

The second case was a man, 29 years of age, who had been subjected to cystoscopic examination while under treatment for a gonorrheal infection of 10 years' standing. The author suspects that the fluid employed to distend the bladder was a strong mercuric perchloride solution. Its use was followed immediately by pain and hematuria. Ten weeks later, when the patient was admitted to the hospital, cystoscopic examination revealed a large quantity of phosphatic debris. The mucosa was greatly congested and covered by a grayish slough. Cystotomy was then performed and showed intense inflammation of the mucosa and scattered patches of grayish sloughs, some of which were free and calculous, while others were firmly adherent to the bladder wall. The most marked involvement was found about the trigone and the orifice of the right ureter. Masses of sloughing tissue were passed

through a Freyer tube for about a week

A cystogram showed irregularity in the contour of the bladder, marked bilateral ureteral reflux and dilatation of the ureters and renal pelves. Two months later, cystoscopic examination showed contractions of the bladder outlet and an undermined pouch in the prostatic urethra.

The fistulous tract was dissected out, the outlet incised into the pouch in the prostatic urethra, and the bladder closed around an inlying ureteral catheter.

A cystogram made after the operation, revealed no improvement in the condition of the neck of the bladder, the ureteral reflux, or the dilatation of the ureters and renal pelves.

In all cases of cystitis with retention, adequate drainage should be established by regular catheterization or cystotomy. Permanent mechanical changes are the result of the destructive process of the gangrene in the musculature of the bladder, particularly about the 3 orifices, and the replacement of the muscle by scar tissue. It appears that the ureteral reflux develops subsequent to the intense cystitis. In the cases in which there is recovery from the gangrenous or necrotic process in the bladder, the chief danger is the development of pyelonephritis as the result of the ureteral reflux. Therefore, any obstruction in the lower urinary tract should be removed or palliated and prophylactic treatment against renal infection should be given.

**TUBERCULAR CYSTITIS — TREATMENT**—C. David (Bull. et mém. Soc. de méd. de Paris No. 2, pp. 51-55 (Jan. 23) 1928) recommends intravesical instillations of lipiodol and

intravenous injections of gonacrine. Ultra-violet radiations are said to have a sedative action. Where there are granulations and localized ulcerations in the bladder, electro-coagulation is used to produce cicatrization of the lesions. As a general treatment, he recommends the antitubercular collovaccine of Grimberg.

**CYSTOSCOPY.**—In 16 cystoscopies, 10 pyelographies, 8 ureteral catheterizations and 4 fulgurations, H. N. Dorman (Virginia M. Monthly 55:310 (Aug.) 1928) resorted to caudal anesthesia with 4 failures and regards this as the method of choice in all difficult cystoscopies in which local anesthesia is inadequate. When properly administered, it does not produce any untoward results and there are no complications.

**CYSTOSCOPIC REACTIONS.**—In the present-day practice of gynecology the employment of cystoscopic examinations has become well nigh indispensable. There are reactions of varying intensity, although seldom of dangerous proportion. H. L. Wehrbein (Ann. Surg. 87:435 (Mar.) 1928) analyzed over 300 cystoscopic examinations done at the Bellevue Hospital, New York. He found that reactions are rarer in women than in men and concludes that they are largely due to infection and trauma. It is quite possible that infection *per se* might set up a febrile reaction, but trauma seems to be such a strong contributory factor that it should be given almost equal weight. He advises the use of utmost gentleness and accuracy by the cystoscopist and the smallest caliber instrument that will permit a satisfactory examination.

**CYSTOGRAPHY** is intended to corroborate cystoscopic findings, according to B H Hager and W F. Braasch (Surg Gynec Obst 44 502 (Oct) 1927) However, it may be of considerable value in demonstrating the presence of lesions of the bladder when the general condition of the patient or technical difficulties preclude cystoscopy It affords a means whereby *diverticulum* of the *bladder* can be recognized, and furnishes information as to the capacity of the bladder and the ability of the organ to empty In cases of *vesical neoplasm*, cystography may show the site and extent of the malignancy and indicate the advisability of operative procedure

Lesions of the bladder secondary to cord changes may be recognized from the characteristic variations in outline, together with evidence of regurgitation of the medium into the ureter and urethra Various *deformities* of the *bladder* occurring with hypertrophy of the prostate have been noted In infants with persistent pyuria, cystography has proved of value in demonstrating the presence of *atony* of the urinary tract with resultant ureterectasis and pyelectasis Deformity of the bladder from extravescical pressure may be recognized in the cystogram, showing an outline which is usually regular, in contrast to the more irregular filling defect caused by neoplasm

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## D

**DEAF-MUTISM.**—This is a condition in which speech is absent, due to a high degree of deafness J S Fraser and H S Nelson (J Laryng and Otol 43 245 (Apr) 1928) have maintained that in the majority of these cases the lesion is in the ear itself They describe a case in which the lesions were found in the auditory paths and centers The patient was a child of 3 years, operated for mastoiditis on the right side and a year later for the same condition on the left side, who finally died from purulent meningitis Sections of each cortex of the transverse gyrus showed ghost cells which were the remains of the nerve cells In the auditory psychic region, the normal landmark could be easily identified, and Broca's area exhibited no change Fraser and Nelson believe that the condition pathologic here, at

least, was a developmental defect, the toxins of the meningitis, or a previous chronic inflammation such as may occur from syphilis or tuberculosis Deaf-mutism being a disturbance only, and primarily, of hearing, the larynx and central portions being normal, therefore a child who is either born deaf or acquired deafness within the first 4 years of life may be mute also, if deafness comes on between the fourth and seventh year, speech is usually altered, and if deafness comes on after the eighth year, speech may not be very greatly affected

J Kerr Love (J Laryng and Otol 44 78 (Feb) 1929) classifies deafness based on the effect of the infirmity on the living efficiency of the individual He maintains that any classification must have more than an academic value, and that deafness is

to be accepted as merely a symptom. He suggests 4 groups: (a) the deaf-mute, (b) the muted or semi-muted, (c) speaking deaf, (d) the partially deaf, hard of hearing and semi-deaf. In class (a) are found those conditions due to a congenital defect in development, of Mendelian characteristic or of hereditary syphilis. In classes (b) and (c) the cause may be epidemic cerebrospinal meningitis and hereditary syphilis. Those patients filing under class (b) and (c) are totally deaf. In the acquired types, both functions are frequently lost, but in the congenital type where there has been hereditary malformation, and the cases in which the organ of Corti is underdeveloped, labyrinthian irritability may still exist.

In order that the afflicted individual may become self-supporting, the ideal time to institute treatment for deaf-mutism is very early in life, at least preceding the school years, in which period the patient learns more quickly. Special schools are being organized for this type of child. Treatment consists of hand language, articulation, and lip reading, the last mentioned being the method of choice.

**DEAFNESS.**—While a variety of types of deafness exist, in this communication it will be considered as a symptom of a disease, either of the sound conducting or middle-ear apparatus, or of the sound perceiving internal ear apparatus. The underlying lesion may be a dry catarrh or an exudative catarrh, a so-called running ear, familial otosclerosis, acquired or congenital deaf-mutism, occupational poisoning or injury.

G. W. Mackenzie (*Eye, Ear, Nose and Throat Monthly* 7:249 (June)

1928) describes *acute exudative catarrh* as one of the most frequently found diseases affecting the middle ear. It is the forerunner of chronic middle ear catarrh or chronic otitis media and is important, because it produces adhesive bands that remain and may later interfere with drainage. According to the location of these bands, they may add to the origin of various types of complication. When recognized early, acute exudative catarrh should respond satisfactorily to treatment. This should be instituted early and before the formation of scars. *Etiologically*, we may regard the situation as a combination of predisposing factors in the form of a nasal or nasopharyngeal obstruction or sub-obstruction, and the presence of a relatively mild infection, sometimes so mild that suppuration does not occur.

*Pathologically*, a low grade catarrhal inflammation of the mucosa lining the Eustachian tube and middle ear cavity exists, an excess of mucoserous secretion develops which is thin at first and later becomes thicker. If the tympanic cavity is not freed early of this secretion, while it is fairly thin, organization of the thicker secretion may occur, subsequently coating the walls of the drum cavity and the tympanic membrane, producing adhesions here and there between the bones and nearby or adjacent points on the inner wall. It may likewise produce an obliteration of the epitympanic space, which then tends to make of a subsequent acute middle ear a chronic one, limited to the attic. At times the exudate organizes in the *aditus ad antrum*, producing a narrowing of the lumen, thus causing the retention of pus in the antrum and mastoid spaces. At other times adhesions

may form in the niche of the oval window, producing ankylosis of the foot plate of the stapes in the window and a condition that resembles otosclerosis.

Subjectively, the symptoms may be few and lack severity. Moderate impairment of hearing, together with a feeling of stuffiness or obstruction in the ear, may be a complaint. This, as a rule, follows a recent cold. The patient may speak of hearing his own voice rather louder than normal on the involved side, due, of course, to the improved bone conduction common to all obstruction conditions. Objectively, the findings may be divided into 2 groups (1) Those found by the functional hearing tests, and (2) otoscopic findings. Tuning forks exhibit the usual findings of obstruction or middle ear deafness. With the otoscope, the middle ear cavity may show a variable quantity of secretion and sometimes a fluid level on top of the exudate which gives a yellowish color to the ear drum. The cone of light is ordinarily still present. Alexander pointed out that characteristically, a narrowing of the hammer handle is found.

**ETIOLOGY**—D W Drury (New England J Med 201:206 (Aug 1) 1929) believes that deafness may result from a lowered basal metabolic rate derived indirectly from some dysfunction of the endocrines. After examining a series of 1000 cases he found 12 per cent showed *ovarian dysfunction*. In these cases, deafness was a presenting symptom in 13 per cent, 34 per cent exhibiting tinnitus and 22 per cent vertigo. A W. Rowe and C H Lawrence (Endocrinology 12:245 (May-June) 1928) found a loss of hearing in 15 per

cent of their patients exhibiting *pituitary disturbances*.

**TREATMENT**—In the early stages, when the secretion is thin, **Politzer inflation** usually will prove sufficient. This procedure causes bubbles to form in the secretion which move to the surface of the fluid and rupture with a consequent lowering of the niveau line. Mackenzie (*ibid*) advocates repeating this measure as long as the niveau line continues to lower and also as long as the patient experiences relief from the fulness in the ear, and improved hearing.

When the condition has advanced to a further stage, it is best to **incise the membrane**, introduce a pledget of cotton into the canal, down to the surface of the drum head, and then inflate with the Politzer bag several times. When the pledget of cotton is withdrawn, a large yellowish mucilaginous somewhat transparent drop of secretion may be found hanging on the cotton. Further inflation may entirely empty the tympanic cavity. This is indicated by a dry whistling noise as the air rushes out of the tympanic cavity through the perforation. At the same time, the patient feels marked relief.

## **DEFICIENCY DISEASES.—**

**Scurvy**—The chief disorders coming under this classification are scurvy, rickets, pellagra, and beriberi or polyneuritis. In this discussion, the more recent findings with respect to *scurvy* will be considered. This disease arises from a lack in the diet of vitamin C. It is most prevalent in English-speaking countries. This is probably due to a greater use of patented infant foods. Of these, those which are composed of dried or condensed milk

combined with starchy foods are most often the cause. It is largely a disease of infants though it may be found in adults living for protracted periods on inadequate diet. The symptoms are tenderness and loss of movement in the extremities, particularly in the legs. There is swelling, infrequently accompanied by hemorrhagic discoloration of the skin along the shafts of the long bones as well as at the epiphyses.

These may show separation on x-ray examination. Latent scurvy occurs more often than is commonly thought. Close examination of the teeth shows typical early scorbutic changes. Denticles are formed in crown and root canal as demonstrable by x-ray. This has been checked by experiments on guinea-pigs. In manifest scurvy, spongy gums, rheumatic pains, debility and mental apathy are to be added to the foregoing. Gingivitis is the outstanding symptom, especially a marked swelling of the interdental papillæ. The disease can be of long duration with intermissions and recurrences. Bromer (Am J Roentgenol 19 112 (Feb) 1928), in an extensive report and review, divides the x-ray changes into 4 stages, which are here abstracted.

The clinically early or latent type of case, the first stage, exhibits as the most consistent sign a smooth transparent ground-glass appearance of the shaft particularly at the diaphysis. A broadened dense zone of temporary calcification at the very end is present. Pencil-thinning of the cortex is found. A dense calcified edge or ring about the epiphyseal center of ossification is constant.

In the second stage, a zone of lessened density appears behind the

dense broad line of temporary calcification at the end of the diaphyseal shadow. First signs of hemorrhage appear.

The third stage is that of sub-periosteal hemorrhages, which may exhibit the density of beginning calcification. The hemorrhagic effusions end, in the child, at the point of attachment of the diaphyseal periosteum to the joint capsule. It is here that epiphyseal separations tend to occur.

In the fourth stage, absorption of hemorrhage and repair of lesions occurs. Progressive decrease can be found on repeated examinations. Thickening of the periosteum remains long after healing begins. The zones of temporary calcification become more dense and broad. The marrow zone framework gradually disappears and becomes more calcified than the rest of the shaft. Finally the ends of the shafts show double lines of calcification.

In x-ray studies of scurvy cases, it is necessary that the rachitic factor be taken into consideration, as when it is present the scorbutic picture is modified. Hematoma of large extent have been noted to leave their marks as long as 3 years after cure in the form of a unilateral thickening of the shaft, according to McLean and McIntosh (Am J Dis Child 36 875 (Nov) 1928), who found that scurvy has a decided tendency to heal by the laying down of new lines of calcification.

These vary from fibrous tissue trabecular changes through to calcification. The rate though not the order of the changes may be altered by nutritive disturbances. Schwartz (Am J Dis Child 34 765 (Nov) 1927) calls attention particularly to epiphyseal changes since he con-

siders these merit more attention. The center of the epiphyseal body exhibits rarefaction and the marginal circumference develops a shaggy band of increased density. This differentiates scurvy from congenital syphilitic osteochondritis and rickets. The epiphyseal changes during healing are also of interest. The greatest growth of new bone occurs laterally and toward the joint surface. This contour apparently lasts for several years.

Turning now to other aspects of the disease than the x-ray, studies made of blood morphology have failed to detect serious deviations from the normal. The cause of the spontaneous hemorrhages in scurvy are attributable to injury done to blood-vessel walls and decrease of thrombocytes to 60 per cent of the normal. In experimental scurvy, pathological changes in the thyroid have been reported by Harris and Smith (*Am J Physiol* 84: 599 (Apr 1) 1928). A papulo-keratotic dermatitis due to scurvy is described. The eruption tends to be symmetrically disposed and generalized on the extremities, part of the face and neck and trunk, but missing the scalp, sternal region, dorso-lumbar region, axillæ, forearms, and hands and feet. Reddish papules from the size of a pin to that of a bean, follicular and perifollicular, resembling acne erupt.

Histologically the hair follicles are cystically dilated and full of a concentric, stratified, hyper-keratotic mass. The epidermis around the follicles is thickened in the granular layer, while the malpighian layer is discontinuously atrophic, acanthotic, and proliferative. In the papillary layer, a round cell infiltration obtains.

Cure is had by diet including lemons and therapy with sodium cacodylate.

Coming now to *treatment*, adequate diet in the vitamin sense is, of course, indicated. **Banana** has been successfully employed for older infants. In cases where intestinal difficulties make selection necessary, trials must be made successively of **raw potato** and the **juices of the lemon, orange, and tomato**. Aron, Hirsch-Kauffmann and Schadrach (*Jahrb f Kinderh* 123: 1 (Feb) 1929) find that **fresh beef liver** possesses good anti-scorbutic properties. The active agent may be extracted with cold water. The daily feeding of the equivalent of 75 Gm (2 drams) of liver as water extract kept animals free from scurvy, while controls on the same diet minus the liver extract developed the disease. The vitamin present in the liver is not destroyed by cooking for 5 minutes in a boiling water bath. Extraction with alcohol apparently destroys the curative substance since neither the extract nor residue acted favorably under the experimental conditions.

### DEFORMITIES OF THE LOWER LEG, PARALYTIC.—

Henderson (*J Bone and Joint Surg* (Oct) 1929), after reviewing 350 cases, has become convinced that restoration of the nerve supply by neurotization has not been successful. **Tendon transplantation** may do much in selected cases to restore function. Support by the fixation of paralyzed tendons, **tenodesis**, has a limited field. Artificial silk or linen ligaments are not satisfactory in the foot, as a rule. Stabilization of the bony structures of the foot offers the widest and most useful field for reconstructive surgery.



The combination of **tendon transfer-ence** and **arthrodesis** (intentional ankylosis of a joint or joints, by roughening up the fibrocartilages and getting bone to bone apposition, followed by fixation in plaster for 8 to 12 weeks) serves to enhance the value of both procedures (The various intertarsal joints are the ones usually selected for fixation)

**DEHYDRATION.**—In a masterly presentation, J L Gamble (New England J. Med 201 909 (Nov 7) 1929) sums up his experiments, his clinical investigations and views on this subject. For purposes of discussion, he presents the body fluid situation in some such way. Fluid is contained in the (1) vascular spaces, *i e*, as blood plasma, (2) in the interstitial spaces between tissues and cells, and (3) inside of the cells themselves. The chief organs for removing water are the kidneys, water is also lost through the lungs, the skin and, to a less extent, via the feces. For reasons which will appear below, the interstitial reservoir is the most important for maintaining water balance, it is this "compartment" which is filled to overflowing in edema, and conversely, it is this compartment which gives up its fluid to the vascular compartment when circumstances drain water from the blood plasma. Now, there is a very important physiological principle always in the background which must be recognized and that is. Volume is determined by the total quantity of substances in solution. For instance, the concentration of substances in edema fluids is the same as in interstitial fluids when the volume is normal. Conversely, in de-

hydration, while the volume of the blood plasma has been reduced, the concentration of substances tends to remain the same. This makes it apparent that an increase in volume is a result of retention of substances and a decrease in volume must represent a loss of substances to the body. From which it immediately follows that supplying water in dehydration is not enough, substances also must be supplied. What should these substances be?

The 2 chief causes of loss of water (and substances) are *diarrhea* and *vomiting*. A study of the substances lost in these conditions will, therefore, indicate what should be used therapeutically in addition to water. It is found that the chief loss is sustained by sodium and chlorine ions, actually far more than the sum total of all the rest of the substances. The indications are therefore clear, **physiological salt solution** and not plain water should be supplied. Now, there is a difference in the ratio of loss of sodium and chlorine ions in vomiting and diarrhea, more chlorine is lost in vomiting. The excess sodium ions left after the chlorine ions have been torn from them are captured by bicarbonate ions. Hence, there is more sodium bicarbonate left in the body after vomiting, and thus a tendency to *alkalosis*. In diarrhea there is more chlorine ion left, and thus a tendency to *acidosis*. The relative amounts lost by vomiting and diarrhea, when both are present in an individual, will determine to a large extent this acidosis or alkalosis factor.

The objection may be raised that at times more sodium is needed and at other times more chlorine. How

can this be adjusted? Fortunately, the kidney is able to discriminate and remove one or the other ion as necessity dictates. A well functioning kidney is therefore of essential help.

On these grounds, the giving of **glucose solutions** is apparently of little help, for glucose is not lost in the first place, and in the second place, it is oxidized very rapidly and thus only water is given. But now other factors must be considered, which in reality make desirable the use of glucose in addition to **sodium chloride**. Any ketosis is immediately abolished by glucose, proteins are spared and the additional water when the glucose is removed from it, is of help to the kidneys in their task, which as a direct result of dehydration is rendered far more difficult. Actually the kidneys are disabled by dehydration.

To return to the statement that the interstitial fluids are the important regulators and not the fluids in the cells themselves, direct analyses have shown (1) that the amount of water inside of parenchymatous tissues is not reduced in dehydration and (2) the composition of intracellular fluid is entirely different from that of interstitial fluid and blood plasma. There is no reason, therefore, for this fluid to enter the plasma, for its composition is so different. On the other hand, direct measurements have shown that there is destruction of muscle tissue, substances and water disappear together.

**TREATMENT.**—Some details of the treatment by Gamble (*ibid*) of dehydrated patients are as follows: **physiological salt solution** intraperitoneally or subcutaneously, 30 c.c. (1 ounce) per kilogram ( $2\frac{1}{5}$  pounds)

of body weight, and 15 to 20 c.c. ( $\frac{1}{2}$  to  $\frac{2}{3}$  ounce) of 10 per cent **glucose solution** per kilogram ( $2\frac{1}{5}$  pounds) intravenously. The hypertonic glucose solution hastens the entrance into the plasma of fluids from the interstitial spaces.

**DELINQUENCY.**—Many different causes of delinquency have been suggested within the last few years, among them, encephalitis, brain injury due to trauma and poor training as a result of improper environment. The first of these has been discussed by R. Cruchet (Brit. M. J. 1 1028 (June 8) 1929). He described instances in which the mental development of children stopped with an attack of encephalitis and regressed thereafter, and the mental debility which resulted produced a variety of delinquency. He differentiated the impulsive, child-like actions of a post-encephalitic patient with the cool determined behavior of the truly perverted one.

Among a group of 120 persons presenting definite personality changes, J. Kasanin (J. Nerv. and Ment. Dis. 69 385 (Apr.) 1929) found 10 per cent who gave a history of skull fracture or severe concussion of the brain. In a series of 120 normal children, only 2 per cent gave a similar history. He concluded that delinquent children should be treated, like those with psychopathic personalities, by **changes in environment** and long, rigorous training in suitable surroundings. As a *prophylactic* measure, for a child who has just received a traumatic cerebral injury, the writer advised **prolonged rest and quiet surroundings**.

W. A. Potts (Proc. Roy. Soc. Med.

(Sect Psychiat) 22.13 (Jan) 1929) and H Additon (J. Social Hyg. 14: 471 (Nov) 1928) emphasized the value of improvement of the home conditions and of the association with other children as a means of *prevention* of delinquency. These authors believed that much greater benefit could be derived from this method of prophylaxis than by treatment in institutions after the delinquency had developed.

The relation of the physician to the administration of criminal justice has received a great deal of attention in recent years. W Overholser (J. A M A 93 830 (Sept 14) 1929) states that the psychiatrist can assist in determining the physical and mental fitness of the patient for trial, in deciding whether the defendant is "responsible" and in providing for his proper disposition.

Overholser also believes that the advice of a psychiatrist is valuable to penal institutions regarding matters of occupation, discipline and parole.

**DEMENTIA PRECOX.** See SCHIZOPHRENIA

**DENGUE FEVER.**—T Pontano (Policlínico (sez pret) 35 2143 (Nov 5) 1928) describes the epidemic in Athens, during the summer of 1928, where there were more than 600,000 cases.

The exanthem was the characteristic symptom. Slight desquamation occurs, but not always. Kidney involvement was common but the most serious complication was parotitis. Relapses or reinfections were common a few days after the first attack. Bradycardia with high fever was a frequent symptom. The blood-pres-

ures were low. Spontaneous hemorrhages were common and caused grave anatomic changes when these hemorrhages were in the nerve centers. Leukopenia with monocytosis was marked.

The early symptoms are Fever, pains in the lumbar region, muscles, and joints, and erythema of the face, trunk and hands. These usually suffice in an epidemic to make the diagnosis.

The causative agent of dengue fever is unknown, but it is assumed to be a filtrable virus, transmitted by *Stegomyia fasciata*.

**TREATMENT.**—The treatment of dengue fever, since the causative agent is unknown, is entirely symptomatic. Quinine has been found of no avail. The pains, the profound asthenia, and the need of relative immobility, force the patient to seek his bed with the first signs of fever. **Amidopyrine** in small doses (up to from 0.5 to 0.6 Gm— $7\frac{1}{2}$  to  $9\frac{1}{2}$  grains—during 24 hours) and **acetylsalicylic acid**, combined with **caffeine**, are useful to combat the fever. **Sodium salicylate** (up to 2 Gm— $\frac{1}{2}$  dram—a day) may also be employed. Sometimes the vomiting and nausea prevent the ingestion of food and drink, and even small doses of medicine. In the latter event, rectal administration of medicines is advisable, and the institution of a **liquid diet**. **Lemonade** and **orangeade** are serviceable. A few drops of **tincture of opium** may relieve, at least temporarily, the obstinate vomiting and gagging. **Morphine** or similar remedies may also be employed when pains, vomiting or epigastric and precordial oppression increase the sufferings of the patient. **Purgatives** during the course

of the disease are harmful, as they may cause sanguinolent mucous enterocolitis, which is one of the most troublesome manifestations of the disease. If that occurs, it is well to limit the diet to rice and rice water, with administration of bismuth or acetyltannic acid, tannin albuminate, or enemas with a few drops of tincture of opium, if there is a violent *diarrhea*. Delirium and hyperexcitation may be combated with opiates and preparations of morphine or heroin. In hemorrhagic types, in addition to the usual aids, a blood coagulating preparation will be found useful in large doses—intramuscularly, intravenously or by mouth.

#### DERMATITIS.—TREATMENT.

S. Neumark (*Dermat Wchnschr* 86 525 (Apr) 1928) reports results of his experience with insulin therapy in different kinds of skin lesions. He states his results in *leg ulcer* have been good, in psoriasis inconstant. In *pruriginous affections* the results were very good. He believes that insulin is indicated in those cases of skin lesions where there is a hyperglycemia or a slight acidosis.

**DERMATITIS HERPETIFORMIS** (Dühring's Disease)—Candido Maderna (*Riforma Med* 44 459 (Apr 16) 1928) states that in the dermatological clinic in Naples a single x-ray exposure over the sympathetic trunks and spinal cord suffices to relieve the itching and hasten the disappearance of the lesions. The region between the scapulæ as well as the loins and sacrum is rayed.

**BAKER'S DERMATITIS**—Erich Schneider (*Ztschr f d Muhlenwesen* 3 35 (June) 1926) states that no justification exists for believing that

"baker's itch" is due to flour. His experiments were made by applying flour on the shaven skin of guinea pigs and mice.

**BROMIDE DERMATITIS**—Mach (*Rev med de la Suisse Rom* 49 286 (Apr 25) 1929) reports a case of bromide dermatitis successfully treated by giving calcium intravenously.

**DERMATITIS MALIGNA** (Paget's Disease of the Nipple)—L. M. Pautrier (*Arch Dermat and Syph* 17 767 (June) 1929) believes Paget's disease to be a true cancer and not simply a dyskeratosis. He regards the pathognomonic feature of the disease to be the large clear cells which migrate through the epidermis and to which he gives the name "Paget cells." He recommends the total and earliest possible removal of the mammary gland.

**UREMIA DERMATITIS**—Rossle (*Virchow's Arch f path Anat* 271 304 (Feb 16) 1929) states that a dermatitis occurs almost constantly in uremia. In uremic dermatitis all transitional forms of dermatitis are found, from simple inflammation of the corium with perivascular cellular infiltration and endothelial swelling to necrosis and vesicular pandermatitis. Chemical tests show a high urea content of the skin in this condition.

**DERMATITIS VENENATA**.—Scheer (*Arch Dermat and Syph* 20 641 (Nov) 1929) reports a case of acute dermatitis following the intranasal use of *ephedrine* in oil. After 4 days treatment with compresses saturated with an aqueous solution of 2 per cent aluminum acetate the eruption subsided. Three months later it recurred following a second nasal treatment with ephedrine.

Templeton (Arch Dermat and Syph 20 83 (July) 1929) reports 5 cases illustrating allergic reactions to the administration of **specific rhus antigen** for poison oak dermatitis. The reaction may be purely local, occurring at the site of injection and manifests itself as a localized urticaria or a generalized eruption, or may appear as urticarial wheals and papulo-vesicles, so commonly noted in dermatitis venenata. The reaction occurs from 24 to 72 hours after the injection. An allergy may or may not have been present. He prevents these reactions by giving small initial doses.

#### ARSPHENAMINE DERMATITIS

—Robinson (Am J Syph 13 536 (Oct) 1929) reports a case in which the entire skin was covered with brownish pigmentations and profuse scaliness with numerous discrete and confluent pustules, fissures, crusts and ulcers of varying size. All the fingers were gangrenous as well as the left hand. Arsphenamine had been given during a period of 9 weeks.

#### REFLEX NEURODERMATITIS—

E Schnabl (Dermat Wchnschr 86 626 (May 12) 1928) reports a case of reflex neurodermatitis. In the case in question a burn of the right forearm was followed by a perfectly symmetrical patch of neurodermatitis on the left forearm. The author suggests that sensitization occurred through the central nervous system which was followed by a chronic inflammation secondary to friction.

#### TOBACCO DERMATITIS — C L

Karrenberg (Dermat Ztschr 52 30 (Feb) 1928) reports a case of a woman, a cigar maker, who for 5 days had been suffering from a prurigenous erythema of the hands. She

recovered in a few days but upon returning to work the lesions returned. It was shown that she was sensitive to an application of 1 100,000 dilution of nicotine but immune to other substances.

#### DERMATOSES IN CHILDREN.—

Leiner (Wien medizinische Wchnschr 79 1139 (Aug 31) 1929) shows that dermatitis generally appears as a result of internal disorders. He traces *toxic erythema* to dyspepsia, to inflammation in the oral cavity, or to toxic influences during the prenatal period. Nutritional disturbances often lead to *furunculosis* or *ecthyma cachecticorum*. Scurvy in children usually results from food deficiencies in vitamin C.

The skin of such patients is pale, and sallow and shows hemorrhagic areas. Children suffering with *thrush* often have a dermatitis of the gluteal region caused by the *Monilia albicans*. *Strophulus* is usually seen in undernourished children with gastro-intestinal disturbances and constipation. A macular eruption is commonly seen in children with a pyelocystitis. *Pseudo-jaundice* occurs in infants fed with carrots. In cardiac valvulitis *erythema* is likely to occur. In endocarditis *erythema annular* is noted. Tuberculosis in children is often accompanied by *erythema nodosum*. In *epidemic encephalitis* a macular eruption is quite common. *Adenoma sebaceum* occurs with tuberous sclerosis.

This stresses the fact that the skin is the mirror of internal processes.

#### DIABETES INSIPIDUS.—

**ETIOLOGY**—Experimental, pathologic and therapeutic studies of diabetes insipidus during the last few

years have tended towards the conclusion that this disease represents disturbed function of the pituitary gland or of nearby structures. E. B. Towne (Arch Surg 18 1165 (Apr) 1929), after experimental surgery on dogs, concluded that there is a secretion from the *pars tuberalis* of the hypophysis, the suppression of which causes diabetes insipidus. The tuber cinereum, rather than the pituitary gland itself, is considered the seat of the pathology by Sato (Klin Wchnschr (Sept 2) 1928), while the infundibulum and hypothalamus generally are blamed by T. B. Fitcher (Am J M Sc 178 837 (Dec) 1929). The latter reports a case with carcinomatous metastasis to these areas, in whom diabetes insipidus developed, although the hypophysis itself was unaffected.

That the vegetative nervous system may play a part in water metabolism is the suggestion of R. Leriche and R. Fontaine (Presse méd 36 1577 (Dec 12) 1928), who showed increase in polyuria by stimulating the superior cervical sympathetic ganglion. L. Hausman and W. Bromberg (Arch Neurol and Psychiat 21 1402 (June) 1929) reported a case in which diabetes insipidus was accompanied by dysostoses affecting the membranous bones of the skull and by exophthalmos—a complex known as *Christian's syndrome*. Hausman also emphasizes the infectious origin of this condition which is further suggested by the reports of E. Ledoux (Bull et mém Soc méd d hôp de Paris 52 1502 (Nov 15) 1928) and Hutinel (Tribune méd. (Apr) 1929), who presented cases of diabetes insipidus following acute encephalitis.

**TREATMENT.**—Recent studies in diabetes insipidus have emphasized the intranasal route in **pituitary therapy**. Either the liquid or powdered preparations may be used. The liquid is recommended by J. R. Campbell, Jr and H. L. Blumgart (Am J M Sc 176 769 (Dec) 1928) and also by H. B. Mettel (Am J Dis Child 38 342 (Aug) 1929) who use 1 c.c. (15 minims) of **pituitrin** sprayed into the nose with an atomizer. Campbell also uses cotton pledgets soaked in 15 minims (1 c.c.) of this preparation which are inserted high into the nasal fossa. Another, increasingly popular method of nasal administration, is the introduction of **pulverized posterior pituitary** as a snuff. D. Adlersberg and L. Forscher (Wien klin Wchnschr 41 1467 (Oct 18) 1928) reports a series of cases demonstrating, he believes, the superiority of this method over all other routes, an observation confirmed by M. Nothmann (Deutsche med Wchnschr 55 579 (Apr 5) 1929) and A. and L. Choay (Presse méd 36 1155 (Sept 12) 1928). This powder may be kept in sealed glass ampoules, 1- and 3-grain (0.065 and 0.2 Gm.) doses being convenient amounts for this purpose. Before beginning intranasal therapy, an anterior rhinoscopy should be conducted to determine the health of the nasal mucous membrane. If this is satisfactory 1 grain (0.065 Gm.) of the powder may be taken, first in one nostril, then in the other. It is introduced just as snuff is, and 3 or 4 doses should be taken daily. In severe cases of diabetes insipidus, where the urinary output exceeds 5 gallons in 24 hours, insufflation should be combined with hypodermic pitui-

tary administration. Most patients with this disease yield to hypophysis therapy and lead comparatively comfortable lives as long as they remain under treatment.

**DIABETES MELLITUS.—ETIOLOGY**—Although extensive investigations have been made along various lines to ascertain the actual cause of diabetes mellitus, no conclusive work has yet been published to ascribe its pathogenicity to any one principle.

P J Cammidge (Brit M J 2 738 (Oct 27) 1928) states that although there can be no doubt that *heredity* plays a part in the production of the defects of carbohydrate metabolism, giving rise to glycosuria and diabetes in many instances, there is not as yet sufficient evidence to justify the conclusion that an inherited factor is a necessary basis for their development in all cases. He goes on to say, however, that the marriage of diabetic persons is inadvisable, and intermarriage between families in which there is even a remote history of the disease, is to be discouraged.

The association of diabetes with *obesity*, has long been the subject of comment by medical observers. The statistical evidence of such an interrelationship is growing with the rapid increase in data afforded by the increasingly large incidence of diabetic disease. Joslin, whose extensive studies of diabetes entitle his conclusions to respect, has ventured the suggestion that the disease is largely a penalty of obesity, and that the greater the obesity, the more likely is nature to enforce it.

M Labbé (Bull et mém Soc méd d hôp de Paris 52 1175 (July 12) 1928) states that in a healthy subject

any *infection* occasions a disturbance of glycoregulation, in a diabetic, it aggravates the diabetes and induces an attack of acidosis. Physicians are not yet sufficiently aware of the danger of the evolutive impetus given to diabetes by infections.

Several cases of transitory diabetes in *febrile diseases* are cited by E Wiechmann (Munch med Wchnschr 75 1035 (June 15) 1928). He reported a case of pneumococcus meningitis and one of lobar pneumonia with temporary glycosuria and glycemia, which could not be explained as of alimentary origin. He explained these phenomena in the first case by injury to the sugar-regulating center in the medulla oblongata by the meningitis, in the second case by a passing toxic injury to the islands of Langerhans.

According to Umber and Rosenberg, a latent diabetes can be rendered manifest and a manifest diabetes can be made worse by severe *bodily or psychic trauma*. Glycosuria, spontaneous or alimentary, is relatively common following trauma or concussion of the brain and other injuries. B Hundsdoerfer (Deutsche Ztschr f Chir 218 277, 1929) presents a number of blood-sugar curves in cases of fracture. The curves indicate that there were disturbances in the carbohydrate metabolism, since later investigations showed that, as the healing of the fracture progressed, the curves returned to normal.

Of special importance is the work of D H Bergey (Proc Soc Exper Biol and Med 24 229 (Dec) 1926) who conducted a series of experiments in which he produced glycosuria in rabbits by the *intravenous injection of diabetic urine* which had

been passed through a Berkefeld filter J C Krantz (Ann Int Med 2 1209 (May) 1929) concludes from zoological and phytopharmacological experiments he carried out, that he could not concur with Bergey's work His experiments contraindicate the existence of a virus of diabetes which in turn may be responsible for transmissibility of diabetes mellitus

P Carnot, Terris and Caroli (Bull et mém soc méd d hôp de Paris 52 738 (May 17) 1928) conclude that there is a close relationship between *ovarian disturbances* and diabetes, and that ovarian extract may reduce glycosuria and hyperglycemia when insulin has failed They describe the case of a married woman, aged 36, in whom diabetes had not been relieved by antidiabetic diet The glycosuria amounted to approximately 100 Gm ( $3\frac{1}{3}$  ounces) daily, acetone and diacetic acid were sometimes present The blood sugar was never more than 2 Gm (30 grains) The patient lost more than 22 pounds in weight in 2 months and became weaker

Two preparations of insulin were administered without results, except that diacetic acid disappeared from the urine Prior to the first symptoms of diabetes, menstruation was delayed, scanty, and finally absent, but before it ceased altogether it was noticed that the glycosuria increased a few days before the period Apparently the ovarian endocrine action reduced the quantity of blood sugar An **ovarian extract** was injected in doses of 1 c c (16 minims) every second day After the second injection a rapid fall in the glycosuria occurred, and the patient's ovarian pain disappeared The general health improved rapidly, and the patient gained

11 pounds in 10 days, menstruation reappeared normally after an absence of 3 months The patient lost the saccharine taste in her mouth and her excessive hunger Some days after the last injection of ovarian extract, glycosuria increased, but it was reduced by a further series of hypodermic injections

Eric Martin (Rev méd de Suisse Rom 49 693 (Sept 25) 1929) concludes that there is a relationship between the *nervous system*, the *glands of internal secretion*, especially the thyroid, hypophysis and suprarenals, and carbohydrate metabolism Acromegalic diabetes may be explained by the neurocrine influence of hyperfunction of the hypophysis, together with modifications of the pancreatic secretions This neurocrine secretion is of great interest, as it demonstrates the histophysiologic relation between a gland of internal secretion and the sympathetic nervous system

The relationship between diabetes mellitus and various forms of *lithiasis* is discussed by B Molnár, Jr (Deut med Wchnschr 55 1127 (July 5) 1929) The material under observation included 323 patients with diabetes mellitus, 949 with gall-stones, and 170 with nephrolithiasis He found that 22.3 per cent of the diabetic patients were affected with gall-stones, whereas 7.74 per cent had renal calculi Among the 949 patients with gall-stones, were 72, or 7.58 per cent with diabetes mellitus Among the 170 patients with renal calculi, were 25, or 14.5 per cent with diabetes

W Wohrmann (Ztschr f klin Med 108 646 (Aug 18) 1928) found an earlier or an existent cholecystitis in 24 per cent of 677 cases of diabetes



Sixteen per cent of the 250 diabetic patients in whom there was no evidence for suspecting cholecystitis, had diabetes in the family history. The corresponding percentage for the 437 diabetic patients who had enlarged liver or a history pointing to an old or recent process under the right costal arch, was 75. For the 160 cases with typical cholecystitis, past or present, it was 61 per cent.

**PATHOGENESIS** — P Mauriac and E Aubertin (Paris méd 1 440 (May 4) 1929) discuss the complexity of the pathogenesis of diabetes mellitus and leaving aside the rôle of disturbances of various endocrine glands (such as the thyroid, suprarenals and hypophysis), the nervous system, and the liver, try to explain the mechanism involved in the pathogenesis of diabetes mellitus of pancreatic origin. Placing insulin in contact with the whole blood, blood serum, plasma or erythrocytes of healthy and sick persons, respectively, they observed an inactivating effect of these substances on the insulin. The same results were observed in experiments with extracts of various organs such as muscles, kidneys or lungs. The inactivation of insulin was greater by the blood of patients with diabetes mellitus and was maximal in the presence of hemolyzed erythrocytes. This was explained by the presence in the erythrocytes of some substance having the power to neutralize insulin. If the permeability of the membrane of the erythrocytes is abnormally increased, this neutralizing substance may inactivate the insulin secreted by a normal pancreas and thus cause hyperglycemia, or the combination of decreased pancreatic secretion and of neutralization of insulin may be

present. Only rarely are the pathologic changes in the pancreas so advanced as to explain diabetes mellitus by only a deficiency of the pancreatic secretion.

**PATHOLOGY.**—W F Gibb, Jr and V. W Logan (Arch Int Med 43 376 (Mar) 1929) made a study of 147 cases of diabetes mellitus in which autopsy was performed with particular reference to the pathologic structure of the pancreas and the clinical course of the disease. Interstitial pancreatitis was found in 123 cases, 79 of which showed well advanced lesions. A direct relation was found between the incidence of interstitial pancreatitis and the lesions of the insular tissue. Tuberculous lesions in the pancreas were not found in any case. Lipomatosis of the pancreas is a late result of atrophy of the acinar tissue due to interstitial pancreatitis. Definite lesions of the islands of Langerhans were found in all but 11 of the cases. One case of calcified islands was seen. No relation was found between the type of cases in which gangrene was present and the degree of injury to the islands. The same is true of coma. An analysis of 11 cases without apparent injury to the islands showed that 6 patients did not have glycosuria when placed on a diet without insulin.

**METABOLISM** — That diabetes is not a disease of carbohydrate metabolism alone (Editorial J A M A 93 34 (July 6) 1929) has been demonstrated by the careful quantitative chemical investigations of the past decade and especially by the study of the disease since the introduction of insulin. Diabetes remains a comparatively innocuous disease as long as carbohydrate metabolism alone is

at fault Of greater evil consequence for the body as a whole than incomplete carbohydrate combustion of excessive protein breakdown, is abnormality in the metabolism of fat From the incomplete oxidation of fat, there results a series of effects which dominate the clinical picture of diabetes and bring about pathologic and physiologic changes more serious than those which exist before fat metabolism becomes faulty The degree and persistence of the lipemia may be a measure of the severity of the disease

I M Rabinowitch (Arch Int Med 43 363 (Mar) 1929) used the quantitative determination of cholesterol in the blood as a measure for the degree of lipemia, and found a direct relationship to exist between the progress and prognosis of the disease and the degree of cholesteremia This was true in both children and adults With no, or only a slight, increase in blood cholesterol, the disease is usually easily controlled by simple attention to diet, with a moderate increase insulin becomes necessary, at higher cholesterol levels, both insulin and extreme restriction of diet become necessary and may fail unless the patient is under constant observation Faulty fat metabolism produces various morphologic tissue alterations Fatty change of the myocardium may exist Lipoid storage by the reticulo-endothelial system may lead to histologic changes simulating Gaucher's disease Marked changes in the arterial system may be induced Gangrene due to arterial obliteration is one of the frequent complications of diabetes The increased incidence of cholelithiasis noted in diabetes by Joslin is probably to be correlated

with lipoidemia Incomplete fat combustion causes its most serious harmful effect in acidosis, which is the dread and often the terminal complication of diabetes

**BLOOD CHEMISTRY.**—H Blotner and W P Murphy (J A M A. 92 1332 (Apr 20) 1929) found that *liver* has a definite effect on blood sugar level Four patients with diabetes taking liver daily or from 3 to 5 times a week, have been observed with repeated blood sugar determinations, for approximately one year, while in 2 who were followed for 20 and 30 days, it was found that the blood sugar has remained at a constantly lower level than previous to liver therapy These observations suggest that liver contains a blood sugar reducing substance active when taken by mouth, non-toxic, and with an effect on the blood sugar concentration similar to that obtained with insulin The author believes that 180 Gm (6 ounces) of liver will have an effect on the blood sugar of diabetic patients equal to that of from 10 to 15 units of insulin

R Paolini and P Cocuzza (Riforma med 44 1622 (Dec 10) 1928) found that in experimental diabetes there is an increase in oxidized *sulphur* and a notable increase in the total sulphur, with a considerable increase of the neutral sulphur In human diabetes there is a decrease of oxidized sulphur and a considerable increase of the neutral sulphur The total sulphur remains within almost normal limits

F B Byrom (Brit J Exper Path 10 10 (Feb) 1929) studied the *phosphorus* content of the blood in diabetes mellitus He found a definite fall in the ester phosphorus content of the corpuscles In acidosis the fall

of the ester phosphorus was greater, so he assumes that this fall is probably the result of acidosis. In fatal diabetic coma the inorganic phosphate rises considerably, probably as the result of renal injury.

The blood *cholesterol* has been found to be raised by G. L. Boyd (Am J Dis Child 38 490 (Sept) 1929) in chronic lipemia. The study was made on 90 diabetic children. There is a tendency to hypercholesteremia in severe grades of malnutrition. The plasma cholesterol bears no relationship to the amount of fat ingested. High blood cholesterol is usually found in cases of hydremia. Hypercholesteremia usually indicates diabetes severe enough to require insulin in the treatment, but low plasma cholesterol does not necessarily indicate that the case is mild. Rabinowitch urges that the estimation of the plasma cholesterol should form part of the routine management of diabetes. In the interpretation of results obtained, consideration should be given to those conditions which might lead to high values. These include jaundice, cholecystitis, pregnancy and nephrosis.

**DIAGNOSIS**—H. Greeley (New York State J Med 27 527 (May 15) 1927) states that the absence of sugar from the urine does not show that a patient is not diabetic in more than one-third of the average run of cases, while on the other hand, the presence of sugar in the urine does not prove a case diabetic, since it might be nephritis or even renal glycosuria that is being dealt with. The presence of evidence of nephritis, both clinical and urinary, together with a glycosuria, might be due to either primary nephritis with a glyco-

suria due to renal deficiency, or to a nephritis caused by a preexisting diabetes. Estimation of blood sugar is the only way in which one may intelligently decide the question as to whether a patient is diabetic, and, if so, gain an idea of the extent of his pancreatic deficiency.

The absence of sugar from the urine of a proved diabetic, unless the particular diabetic be proved to have a normal threshold, cannot be taken to indicate that treatment has restored the balance of carbohydrate metabolism. The blood sugar must rise above the normal threshold before evidence of renal irritation or secondary nephritis can be produced.

In nephritis, owing to the damaged renal epithelium, glycosuria with a normal blood sugar may exist or, that which is more common, both glycosuria and hyperglycemia—the latter probably due to excessive mobilization of glycogen by suprarenal over-secretion, excited by retained wastes.

In order to determine whether the sedimentation speed of the erythrocytes is influenced by the sugar content of the blood and the urine, or by insulin injections, Wisselink (Munch med Wchnschr 76 1373 (Aug 16) 1929) made tests in 63 patients with diabetes mellitus. From the result of his observations he draws the following conclusions:

The sedimentation speed of the erythrocytes is not dependent on the clinical aspects of the disease. Acidosis reduces the sedimentation speed to a certain extent. In cases of a high sugar content in the blood and in the urine, the sedimentation speed is frequently reduced. However, in some instances, the blood sugar seems to have no essential influence. The

effect of insulin on the sedimentation speed of the erythrocytes is not lasting. Only in 1 instance was a considerable reduction noted. Tests that were made 2 hours after the insulin injection gave varying results. In 2 instances a marked reduction was noted. Examinations that were made 24 hours after the insulin injection, proved that the reduction of the blood sugar content parallels an increase in the sedimentation speed. In tests that were made during the first and second hour after the insulin injection and in those that were made 24 hours later, the reactions differed somewhat from those in the patients who did not receive insulin. The sedimentation speed of the erythrocytes in diabetic patients is not of prognostic value.

**BLOOD-PRESSURE**—D W Kramer (Am J M Sc 176 23 (July) 1928) found that the frequency of hypertension in diabetes is more common than has been believed. In his study of 500 consecutive cases, 195 patients (39 per cent) showed a blood-pressure of 150 mm of mercury or above. The presence of hypertension in diabetic patients may be attributed to various factors, the pathogenesis of these conditions is practically the same and they are apt to appear in those past middle life, the highest percentage occurring in the sixth decade. This was evident in both series, 36.2 per cent being found in the diabetic group and 39.1 per cent in the hypertensive non-diabetic group. Individuals with persistent hypertension of the non-nephritic type may in time develop diabetes. It is unlikely that diabetes, through its hyperglycemia, produces hypertension.

**ELECTROCARDIOGRAPHIC STUDY**—In a series of 123 diabetic patients studied by J Hepburn and D Graham (Am J M Sc 176 782 (Dec) 1928) 56 showed serious electrocardiographic abnormalities at the beginning of diabetic treatment. In a very fair percentage, the electrocardiograms returned to normal after the diabetic condition was controlled by treatment. It would appear from these observations that in the cases in which the electrocardiograms returned to normal after the diabetic condition had been controlled, the abnormal electrocardiograms had resulted from the effect on the myocardium of the perverted metabolism present in the diabetes mellitus. Whether this is a direct action on the myocardium or an indirect one resulting from disease of the coronary arteries, or both, is a difficult question to answer. If one considers first the possibility of a direct effect on the myocardium, it may be stated that none of the few cases of severe acidosis studied showed an abnormal hyperglycemia and in many cases of severe diabetes with hyperglycemia the electrocardiograms were normal. As hyperglycemia and the products of the perverted metabolism present in diabetes mellitus apparently do not produce a direct effect on the myocardium resulting in an abnormal electrocardiogram, the possibility of an indirect effect from disease of the coronary arteries appears more likely.

**DIABETES AND PREGNANCY**—Numerous reports have been made by various contributors on the subject of diabetes and pregnancy. All agree that severe diabetes, even with acidosis or coma, complicating pregnancy can be controlled so that a

living child will be born on time if sufficiently early and energetic treatment is given with an insulin that is not too highly purified. Insulin that is too highly purified tends to produce a hyperglycemic state.

E Holzbach (Zentralbl f Gynak 53 641 (Mar 16) 1929) gives the case report of a diabetic patient who became practically sugar-free during the last 2 months of a pregnancy, the birth of the child, however, was followed by the reappearance of the diabetes in the mother. He believes that this temporary remission is to be explained by the fact that the internal secretion of the unborn child took an active part in the carbohydrate metabolism of the mother.

K S Smith and F Roques (Brit M J 1 66 (Jan 12) 1929) observed the case of a woman in whom the blood sugar fell to an alarmingly low level 6 days after delivery. They give a warning that hypoglycemic coma may occur after delivery if the dosage of insulin is not reduced.

**COMPLICATIONS**—One of the most common complications in diabetes is arteriosclerosis. There has been much discussion and variance in beliefs as to whether arteriosclerosis precedes diabetes or whether diabetes causes arteriosclerosis. It is true that arteriosclerosis progresses much more rapidly in a diabetic than in a non-diabetic. Such complications as endarteritis obliterans, thromboangitis obliterans, neuritis and gangrene are often seen. Diabetes may be associated by exophthalmic goiter, acromegaly, hypertrophic adrenals, syphilis and tuberculosis.

H Ulrich (Arch Int Med 43 785 (June) 1929) states that a demonstrable failure of insulin to produce its ex-

pected and usual results should be regarded as a link in the chain of evidence leading to a diagnosis of hypopituitary disease.

The ocular lesions complicating diabetes are varied, according to M Cohen (Arch Ophth 2 529 (Nov) 1929) and occur in from 20 to 30 per cent of the cases. Retinitis is the most frequent lesion of the eye associated with diabetes, while the disorders more rarely observed are cataract, chronic retrobulbar neuritis, muscular disorders, disturbances of accommodation, refraction and iritis. Children rarely show any complications of the eye in this disease.

**ACIDOSIS**—D McCarthy (Minnesota Med 11 158 (Mar) 1928) analyzes 20 cases of diabetic acidosis and coma from the standpoint of symptomatology. Apart from the abnormalities of the urine, he regards the following signs as important: flushing of the face and sluggish mentality, odor of acetone in the breath, increase in the depth and frequency of respiration—this sign, and dryness of the mouth, being always present. Other common manifestations are pain in the upper abdomen and vomiting, and decrease in the intraocular tension. This last mentioned sign is of decided importance since its absence in a comatose patient, who is known to be a diabetic, may prompt search for and discovery of, a vascular lesion such as cerebral thrombosis, and so avert the danger of an unnecessary injection of insulin. A leukocytosis of 13,000 to 30,000 per c mm is a constant finding, but the numbers always return to normal on recovery from coma. The presence of such leukocytosis in association with abdominal pain and vomiting

may lead to a mistaken diagnosis of an acute abdominal condition.

For the general management of acidosis or coma, the author considers reassurance, warmth, normal saline enemata, and the administration of fluids as the most important measures. Fluids should be given by the mouth if possible, or, failing that, by the rectum or subcutaneously. Gastric lavage is necessary if there is vomiting, and hypodermic injections of digifolin are recommended until the patient is out of danger. The method of administration of insulin depends upon the degree of acidosis, if this is not severe the patient is given 8 oz (240 cc) of milk and 10 to 20 units of insulin every 4 hours, the later doses of insulin being controlled by urine examination. In the more severe cases an initial dose of 30 units is given intravenously and repeated every 2 hours until the urine is sugar-free, the dose is then decreased and the patient begins to take milk or orange juice.

A F Hartmann and D C Darrow (J Clin Investigation 6 257 (Oct) 1928) describe the chemical changes that occur in the body in diabetic acidosis. They conclude that in severe acidosis, marked concentration of the plasma occurs, with, however, slight diminution of total base. Bicarbonate and chloride are diminished relatively more than ketone acid, and protein is increased, although increase in ketone acid usually exceeds diminution of bicarbonate. When treatment consists only of administration of water and insulin, with or without carbohydrate, bicarbonate and pH are at first restored relatively very slowly because, as base is released by oxidation of the salts of the ketone

acids, it is claimed in large part by acids other than carbonic, chief among which is chloride. Later secretion of chloride into the urine bound to ammonia aids in the restoration of plasma bicarbonate. Salt solution administration adds little, if any, toward the early recovery of plasma bicarbonate. Alkali (sodium bicarbonate) when properly administered along with water, insulin, carbohydrate and salt solution, may provide a very rapid, safe and complete relief from acidosis.

Diabetic acidosis may exist with a negative ferric chloride reaction in the urine. K E Appel and D A Cooper (Am J M Sc 173 201 (Feb) 1927) say that an absent ferric chloride reaction in the urine (1) does not preclude the diagnosis of threatened diabetic coma, (2) in a case of diabetic coma under treatment does not mean always that the case is well under control, (3) does not mean necessarily that the plasma CO<sub>2</sub> content is out of the acidotic range, (4) cannot be taken to indicate that the blood ketones are not greatly increased, (5) as an explanation of an absent ferric chloride reaction in the urine in threatened diabetic coma with a low CO<sub>2</sub>, in diabetic coma with considerably increased blood ketones, it is suggested that the absence is probably due to temporary renal impairment usually on a basis of dehydration.

E P Joslin (J A M A 93 33 (July 6) 1929) states that the diagnosis of diabetic coma depends largely on a history of its gradual onset. The patient has felt sick and looks and acts seriously ill rather than in collapse, as in insulin shock with tremor and sweating, unconsciousness or

convulsions Inquiry shows that insulin has been omitted or that the customary dose became inadequate, because the patient broke his diet or contracted an infection Usually nausea, vomiting and pain, simulating serious abdominal disease, have led to the omission of food and in consequence the body has had nothing to live on except its own protein and fat and hence has developed acidosis Gradually increasing restlessness, a deepening of the respiration into air hunger, but without cyanosis, and a change from drowsiness to coma develop, quite in contrast to the symptoms of insulin shock, whose onset is swift, complete and without difficulty in breathing. In coma the urine, obtained by catheter if necessary, contains sugar and acid, in insulin shock the urine is sugar-free unless it collected in the bladder before insulin began to act

In the *treatment* of diabetic coma the following course is outlined by Joslin (*ibid*)

1 The treatment of this condition is that of an emergency and takes precedence over all else The diagnosis once made, insulin should be injected every half hour subcutaneously, from 10 to 40 units or more, until returning consciousness, normal respiration and decreasing glycemia demonstrate beginning recovery If insulin is given intravenously, it should always be given subcutaneously as well

2 Since the tissues of the patient are dehydrated, a liter (quart) of physiologic solution of sodium chloride should be inserted under the skin at once It is dangerous in coma to trust to the retention of liquids by mouth or the absorption of salt solu-

tion by rectum Intravenous injections are satisfactory, if given slowly to avoid distention of the heart

3 The circulation should be stimulated with **caffeine sodium benzoate**  $7\frac{1}{2}$  grains (0.5 Gm) given slowly, if indicated, every hour for 4 doses

4 The **stomach** should be gently washed out so that liquids will be retained Useful liquids are water, broths, coffee, tea, gruels and often most desirable of all, for the first 24 hours, 2 or 3 glasses of **ginger ale** or the **juice of 3 oranges**; in other words, about 50 Gm ( $1\frac{1}{3}$  ounces) of carbohydrate Thereafter one may return to the simpler articles of the regular diet, all the while regulating the dosage of insulin by tests of the urine at first every 2 hours, later lengthening the intervals to 4 or 6 hours The dosage is 15 units of insulin for a red test, with Benedict's solution, 10 units for a yellow test, 5 units for a green test, but no insulin if the urine is sugar-free With measures such as these, recovery is almost certain unless the complicating disease is of itself fatal

**TREATMENT**—The treatment of diabetes is essentially one of diet and the use of **insulin** in severe cases The success of the treatment is only possible through education of the patient Various forms of diet have been recommended such as the high fat diet, the high carbohydrate diet, etc Fundamentally, the number of calories required daily depends on the weight, height, age and sex of the patient and, naturally, also on the degree of activity According to the method of diet calculation (Lilly Research Laboratories), in treating diabetes it is seldom desirable to give less than the basal caloric require-

ment, and if the patient is underweight, the diet should be gradually increased as soon as the patient's urine becomes sugar-free so that he will gain weight in a satisfactory manner. If he is overweight, his caloric intake should be sufficiently low to induce gradual loss of weight, and this is best done by controlling the amount of fat in the diet and giving sufficient carbohydrate to avoid glycemia and prevent acidosis. Finally, a diet should be given which is just sufficient to maintain the patient at a desirable weight without causing excessive glycemia or acidosis.

1 For the *adult patient confined to bed*

G = total glucose, C = carbohydrate,  
P = protein, F = fat

Total calories divided by 17 = G

$$\frac{2 \times \text{weight in Kg}}{3} = P$$

$$C = \frac{8G}{10} - \frac{P}{2}$$

$$F = 2C + \frac{P}{2}$$

2 For the *ambulant adult patient*

For the diabetic who is not overweight, 30 calories per kilogram (2½ pounds) may be given with safety and the daily diet made to provide 1 Gm (15 grains) carbohydrate, 1 Gm (15 grains) protein and 2.5 Gm (38 grains) of fat for each kilogram of body weight.

3 For the *obese patient*

The diabetic patient who is overweight should receive 1 Gm (15 grains) carbohydrate and 2 Gm (30 grains) of fat for each kilogram (2½ pound) of actual weight and 1 Gm (15 grains) of protein for each kilogram of what his weight should be according to his age and height. Thus

gradual weight reduction should be attempted and can be brought about by gradually reducing the carbohydrate and fat in equal amounts, and if the urine does not become sugar-free by the time the carbohydrate given is equal to the protein, then insulin should be given.

4 *Children*

Diabetes in children is usually harder to combat and it seems desirable to treat even the mild cases with insulin. Children also require more protein (1½ to 2½ Gm—23 to 38 grains—per kilogram—2½ pounds) and less fat per kilogram than an adult, since they need extra protein for growth and should not be given high fat diets since they acquire acidosis easily and are quickly affected by it.

INDICATIONS FOR INSULIN—

When a patient continues to excrete sugar after being on a diet as above outlined for 5 or 6 days, then insulin should be given. L. I. Braun (J. M. A. South Africa 3:151 (Mar) 1929) states that cases needing insulin should receive it in small doses once a day, and these doses should be gradually increased until the maximum effect, without over insulinization, is reached with this 1 dose. If possible the case should be controlled with 1 injection daily, though it is rarely advisable to administer more than 20 units in 1 dose. It is wiser not to give insulin at night, as hypoglycemia may occur during sleep. The author has found that the use of insulin may safely be discontinued, dependent on the severity of the condition. If *coma* supervenes, as much **fluid** as possible should be given and **insulin** be injected in large doses. **Carbohydrate** in 2 forms, **milk** and



glucose, is also advised, 15 Gm (23 grains) of carbohydrate for each unit of insulin

In surgical cases the patient must be rendered free of sugar and acid bodies before operation. Insulin is nearly always essential, since mere dieting will not suffice owing to the lowered tolerance due to the sup-puration. Various forms of treatment of diabetes have been heralded from time to time, but none of them have been found to be universally effectual. Among them may be mentioned x-ray irradiation, high voltage x-ray irradiation of the hypophysis, derivatives of acridine, blueberry leaf extract, the vinca treatment and quinine. Synthalin has probably given more promising results in the treatment of diabetes mellitus than any other product outside of insulin. G G Duncan (Am J M Sc 175 196 (Feb) 1928) draws the following conclusions on the use of synthalin in diabetes mellitus. Ten milligrams ( $\frac{1}{8}$  grain) of synthalin, 3 times daily before meals, for 2 successive days, omitting the third day, serves as a starting point with adults. As the doses are increased, strict instructions to stop all synthalin for 24 hours in event of even the mildest symptoms of over-dosage appearing, should be given. The same dosage may be resumed after a 24-hour rest if decholin is used. If it is not, a lower level should be maintained to prevent the toxic effects of synthalin.

There is no doubt but that synthalin affects the level of the blood sugar. Whether treatment over a period of years will prove detrimental or not, has yet to be proved. At the present one feels justified in using synthalin in every case of diabetes

If there is a substantial reduction in the insulin or an elimination of one or all doses, the additional bother and expense (if any) seems warranted.

On the other hand, if proper facilities for educating the patient are not available, or if the total unitage of insulin is reduced and not the number of doses, the simpler method seems more applicable. Oral administration is the chief relief to the patient but probably the best feature of its use is that it enlarges the "non-insulin" group of diabetic patients.

**DIABETES MELLITUS IN CHILDREN.—CLASSIFICATION**—There are but 2 types of diabetes mellitus, severe and mild. An essentially mild case may show all the signs of severe disease for considerable periods of time and yet, as the result of proper treatment, regain its original status and retain it until death occurs from other causes. Conversely, the intrinsically severe form may exhibit periods of comparative quiescence, but the original and fundamental quality never disappears permanently. (H R Geyelin and T T Mackie, New York State J Med 29 677 (June 1) 1929)

The incidence of diabetes mellitus in children apparently is not very great. E P Joslin (J A M A 88 28 (Jan 1) 1927) found that children constituted only 7 or 8 per cent of all his diabetic patients. Again, only 5 per cent of the patients admitted to the diabetic clinic of the Montreal General Hospital were 15 years of age or under. It is to be noted here that children in the first 15 years of life represent about 25 per cent of the total population. (I M Rabino-

witch, Canadian M A J. 20 488 (May) 1929)

**ETIOLOGY.—PREDISPOSING CAUSES.**—The hereditary and familial factors, while generally recognized as predisposing agents in diabetes, probably play a greater rôle than is commonly supposed E P Joslin and Priscilla White (J A M A 92 143 (Jan 12) 1929) obtained an hereditary history in 17 per cent of a group of diabetic children who died In a group of 102 patients with diabetes these authors reported that an hereditary or familial history was obtained in 32.3 per cent They have demonstrated the fact that the chance for establishing the evidence of the hereditary character of diabetes in the child grows as his relatives of the preceding generation approach middle life and those of his own generation increase in number R Priesel and R Wagner (Klin Wchnschr 8 1398 (July 23) 1929) asserted that of the 27 per cent of their patients giving an hereditary history, the greatest number was found in Jewish children This observation is of particular interest in view of the statement made by E P Joslin (J A M A 88 28 (Jan 1) 1927) concerning racial predisposition to diabetes According to the latter, diabetes in children, unlike the case of adults, is more common among children of the Gentiles than among those of the Jews

**EXCITING CAUSES**—Whether *infections* hold more than a coincidental or complicating association with diabetes is not quite clear Dorothy Hare (Proc Roy Soc Med (Sect Study Dis Child) 22 1031, 1929) reported a case of diabetes in a mongolian idiot which developed after an

attack of measles Two per cent of the diabetic patients studied by Priscilla White (J A M A 88 170 (Jan 15) 1927) gave no history of infection Sixty per cent of her cases did not have an infection in the year preceding the onset and in the remainder of the cases the association appeared incidental rather than causal However, it is possible that results of an infection may be latent and the harmful end-results might not appear until after a lapse of a period of years

**PATHOLOGY.**—In the pancreas of the diabetic child, in contrast to that of the adult, little pathologic change can be found, either in the islands of Langerhans or in the acinous tissue The changes which are noted differ from those commonly reported in the adult Lymphocytic changes are found in the islands of Langerhans of the child and hyalinization in the islands of Langerhans, in the adult While the pancreas in diabetic children may be smaller than normal, the amount of island tissue is not sufficiently reduced, in most instances, to account for the disturbed metabolism (S Warren J A M A 88 99 (Jan 8) 1927)

**SKELETAL GROWTH**—Growth in height in children, according to W S Ladd (Am J Dis Child 32 812 (Dec) 1926), diminishes or stops completely, depending upon the severity of the disease and appears to be due to a lack of food Ladd stated that the impulses for growth in height seem to persist longer under the adverse conditions of diabetes and to be slower in starting again than the impulse for change in weight Insulin enables the patient to use sufficient food, and growth

follows Priscilla White (*loc. cit.*) found that 87 per cent of her juvenile diabetic patients were over height according to the Holt Standard Gladys Boyd (Canadian M. A J 17 1167 (Oct) 1927) noted a more marked effect of undernutrition in height in children with diabetes than in control children in whom skeletal growth often proceeded in spite of undernutrition It was found, too, that the height of the diabetic child deviated from the normal in direct proportion to the duration of the disease, *i e.*, before treatment was started In those cases in which the disease was present 1 month or less, all the patients were either normal or overheight for their weight and age Insulin itself seemed to exert some stimulating effect on growth I M Rabinowitch and Eleanor V Bazin (Arch Dis Childhood 4 125 (June) 1929) found that overheight diabetic children grew less rapidly than a control, overheight, non-diabetic group The normal or underweight diabetic children also grew less rapidly than the corresponding control group, although the difference was not so great here as in the first comparison related These observers felt that the average rate of growth after treatment was less than normal

*Overheight* at the onset of diabetes is a characteristic of the disease in children and not overweight as in the adult (E P Joslin and Priscilla White (*loc cit*))

**PROGNOSIS**—A number of factors seem to have an important bearing upon the prognosis of the child The *age* apparently affects this outlook Generally speaking, the younger the child, the more acute the disease

and the more difficult it is to establish control (Boyd, *loc cit*) *Heredity* plays a definite part E Joslin (*loc. cit*) stated that nearly all the instances of long-lived diabetic children reported, inherited the disease *Obesity*, too, in the treated case alters the prognosis in 2 ways In aglycosuric cases, it not only increases the need for insulin, but also, should acidosis or coma develop, it makes the recovery more doubtful J W Sherrill (California and West Med 28:788 (June) 1928) found that 80 per cent. of the deaths due to coma in diabetes occurred in patients who were more than 20 per cent overweight *Infections* cause a temporary depression of carbohydrate tolerance. Influenzal infections seem to be particularly resistant to insulin (Boyd, *loc cit*) While diabetes invariably is made worse by infection, this action is also invariably temporary according to E Joslin and Priscilla White (*loc cit*) These authors also noted that appendicitis is the most dangerous surgical problem in the diabetic child, because it so closely resembles diabetic coma and at times is associated with it

With the introduction of insulin into the realm of diabetic therapy, the prognosis as to life has been greatly improved Of the 30 children with diabetes treated at the Pirquet clinic before insulin became available in 1922, all eventually died Only 1 child of a group of 94 has died since that period (R Priesel and R. Wagner Wien klin Wchnschr 42: 1170 (Sept 5) 1929) Rabinowitch (*loc cit*) observed a group of 71 diabetic children of whom 67 were still alive at the time of the report Two of the 5 deaths were due to causes

other than diabetes. In a 22 month period beginning with the use of insulin, Joslin and White (*loc cit*) found that among a group of 300 diabetic children the total mortality was 6 (1 per cent a year). However, in the 6 year period preceding the insulin era, the total mortality for 337 diabetic children was 36 (2 per cent a year). Joslin and White believed that coma is the chief cause of death in diabetic children, and unfortunately signified improper treatment.

The outlook for the properly treated diabetic child is not only very good but, according to Rabinowitch (*loc cit*) much better than that of the adult with diabetes, since proper treatment tends towards improvement of carbohydrate tolerance. Pathologic examination also furnishes a certain degree of evidence supporting the belief that pancreatic regeneration may occur (Boyd, *loc cit*). Although results are encouraging, there is no proof as yet that the present day treatment can result in a cure. On the other hand, there is no clinical or experimental evidence of an inherent tendency of the juvenile diabetic to become worse (Rabinowitch, *loc cit*).

Of all means available for the estimation of prognosis of the diabetic patient, a knowledge of plasma *cholesterol* is, according to Rabinowitch, the best. There is a definite relation between duration of life and the quantity of plasma cholesterol. Children in whom the diabetes is not controlled, tend to have a high blood cholesterol and in them insulin intake cannot be reduced. Boyd (*loc cit*) found that hyper-cholesteremia is not incompatible with improving tolerance, but is more often seen in

patients not treated with insulin and who are progressing favorably, than in those treated with insulin who are not following a similar course. Joslin and White found that the cholesterol values of the blood of the diabetic child were usually lower than those considered normal for such patients, and that with increasing duration of the disease there was a tendency towards still lower blood cholesterol.

**TREATMENT**—The 3 most important phases of proper treatment, according to Rabinowitch (*loc cit.*) consist of (a) keeping the urine free of sugar, (b) keeping the blood sugar normal and (c) preventing overweight.

The physician who treats diabetic children today aims to have them reach normal adult life and this can usually be accomplished. A. E. Fischer (Am J Dis Child 38 323 (Aug) 1929) felt that the underlying purpose, namely the production of growth and development, may be defeated when the attempt is made to keep the urine sugar-free. By increasing the diet and dosage of **insulin**, a child may develop glycosuria sometime during the 24 hours, yet, in spite of this, gain in weight and in height. Because of the greater danger of insulin shock in children than in adults, A. A. Levy (M J and Rec 125 820 (June 15) 1927) also considered it a good plan to permit a moderate glycosuria. Most authors believe that the urine should be kept sugar-free if possible. However, few children in whom diabetes is of long duration are sugar-free throughout the entire 24 hours. Diabetic children, sooner or later, must be treated with insulin and the

sooner the treatment is begun, the better will be the final results

**SYNTHALIN TREATMENT**—R Freise and F Einecke (*Monatschr f Kinderh* 35 537, 1927) used synthalin in the treatment of 6 diabetic children and found it to be valueless. However, J A Langer (*Monatschr f Kinderh* 43 457, 1929) obtained satisfactory results from the treatment of 6 children with synthalin. H Hirsch-Kauffmann and A Heilmann-Trosien (*Jahrb f Kinderh* 118 47 (Nov) 1927) found that glycosuria and glycemia are diminished by the treatment. A combination of insulin and synthalin treatment leads to considerable reduction in the amount of insulin required. A course of synthalin should be started with the smallest possible dose. The maximum should not be more than 1.5 mg ( $\frac{1}{40}$  grain) per kilogram ( $2\frac{1}{5}$  pounds) of body weight. While a 24 to 36 hour interval has been recommended between doses, these authors found the interval could be reduced to 16 hours without bad effects. Synthalin treatment is contra-indicated in coma and in the pre-comatose stage, as well as in very young or underweight children.

**DIABETES, SURGICAL ASPECT.**—The occurrence of surgical diseases in diabetics is sufficiently frequent to necessitate thorough knowledge of these conditions by both the internist and the surgeon. It is also imperative that they cooperate in the care of such cases.

According to E P Joslin (*Boston M and S J* 196 127 (Jan 27) 1927), co-operation is the keynote of surgery in diabetes. Without a laboratory, the surgeon is handicapped. Joslin says a clinical

sense and the interpretation of symptoms will not avail in diabetes. Clinically, he cannot diagnose the onset of diabetic coma even 24 hours before the patient is unconscious, but with the aid of the laboratory he can absolutely prove its insidious approach and stop it. Clinically, he cannot tell whether a patient is sweating because of sepsis or because of insulin taken, but with laboratory tests he can know in 20 minutes. He says diabetic laboratories must become more common and the tests performed less expensive. The tests are now simple and are becoming simpler.

Surgical diabetics make equal demand upon physician and surgeon. The time consumed in the medical care of a surgical diabetic is just as great as that required for the surgical care, but the surgeon should not himself take this necessary time, he should work with a doctor. The surgical diabetic is a serious diabetic. It is the surgical diseases and arteriosclerosis that kill the diabetic today. The surgical diabetic needs far more care than does the medical diabetic. It is seldom the surgeon is to blame for the surgical mortality. Usually these cases came to him too late because preventive measures had not been instituted early enough, had not been instilled into the minds of the patients. Cases of diabetes in coma are visited by a physician every hour, surgical cases need almost as much care. For this reason it is essential in hospitals that surgical cases be grouped with medical cases. Borderline wards for medical and surgical diabetics, and maybe for patients with other diseases, should exist in every hospital.

The surgical diabetic is not only a

serious diabetic but he is a complicated diabetic as well. He has been accumulating disease and an additional handicap, even though slight, renders him an easy prey to complications. Joslin believes every other diabetic out of the entire number may be a surgical diabetic before he dies. He says that among the older diabetics it almost seems as though they were foreordained and predestinated to surgery. Many of them have gall-stones as an antecedent and possible causative factor of their diabetes, and they are predestinated, because with time they develop arteriosclerosis with its surgical complications in the lower extremities, or because they become the host of an infection. Amputations and infections through the skin make up nearly half of the total operations. These are conditions which are largely preventable and it is the duty of all medical men to warn their diabetic patients of the dangers to which they are exposed and thus save needless suffering and death.

It is the group of younger diabetics under 51 years of age, which is growing in numbers and the older surgical group which is lessening. The youngest group is growing because, first, these patients live so much longer now compared with previously that there are more of them and second, there is a greater opportunity for surgery, because improved medical methods make operations of election safe. The oldest surgical group of all is diminishing in numbers and should decrease still more, because preventive measures are converting what formerly was major surgery into minor surgery or no surgery at all.

Joslin (*ibid*) writes of appendicitis,

gall-stones, disease of the thyroid, cancer, particularly of the pancreas, and diabetics' legs to illustrate and emphasize certain medical features of diabetic surgery. He says diabetic surgery reflects the surgery of the future in that it is largely preventive. According to diabetic law, an infection makes a diabetic worse, but it is the surgical procedure which removes the infection and brings to an end infections of the feet. According to another diabetic law, an increased metabolism transforms a mild diabetes into a severe one, but the surgeon intervenes in hyperthyroidism and transforms the diabetic into his original, and usually benign, state when he removes the thyroid. *Gall-stones* frequently precede diabetes and they vanish at the hands of the surgeon who does not realize how often the operation actually prevents the later development of diabetes. Joslin concludes by saying that today there are many diabetics, because they live longer and insulin has set them free. He says that every third diabetic, and probably every other diabetic, at some time in the course of his disease needs the surgeon.

There seems to be a reciprocal action between the parotid and the pancreas which has an influence in diabetes. Thus, Seelig (53 Tag d Deutsch Ztschr f Chir, 1929) found that ligation of Stenson's ducts in dogs led to the changes in the blood sugar level. Experimental diabetes produced by total extirpation of the pancreas and Sandmeyer diabetes were not, however, affected by the ligation. In several clinical cases of diabetes it was possible, by ligating the parotid ducts, to reduce the required insulin dosage and to keep the

patient sugar-free for some time. But in other cases a total failure was recorded. The technic of the operation is described by Gohrbandt. An incision is made around the opening of the duct in the mouth, the duct drawn forward, resected and ligated. This operation is followed by swelling of the face which subsides in a few days. Gohrbandt has performed the operation in 18 cases. In 12, permanent obstruction of the ducts resulted and in 6 the ducts opened up again. It is possible that accessory ducts were present and began to function. In discussing this report, Schoenbauer, of Vienna, called attention to the fact that diabetes induced artificially in the dog can be cured by adrenalectomy, and stated that in his opinion the operation acts by excluding the sympathetic nerve trunks. The most important sympathetic nerve trunks coming into consideration run in the hepato-duodenal ligament. After division of this ligament, the blood sugar level had risen to 120 mgm per 100 cc, fell to 80 mgm, but later rose to 120 mgm. The operation influenced also the course of artificial diabetes, but its effect persisted for only a short time.

#### PREOPERATIVE OPERATION

—The essentials of preparation in elective cases, according to E. W. Demaree (Anesth and Analg 18:319 (Sept-Oct) 1929) are the determination of the sugar tolerance and the pancreatic efficiency of the individual, control of glycosuria and acidosis, the maintenance of blood sugar at a relatively low level increasing the sugar tolerance to its highest possible point. Even then one should carefully weigh the condition of the patient and the

severity of his case against the severity of the operation and the benefit to be derived from it.

The blood sugar, glycosuria, and acidosis are controlled by measured diet, injections of insulin, and if necessary, glucose, sufficient fluids and frequent laboratory examinations of the blood, urine and carbon dioxide combining power. Joslin has discontinued the use of alkalies, even in coma, and obtains better results. It should be remembered that, in the presence of infection, insulin loses part of its power, one unit utilizing only about 1 gram of carbohydrate.

Anesthetics in order of their desirability are spinal if below the diaphragm, otherwise ethylene, nitrous oxide and oxygen, and lastly ether. Chloroform should not be used.

#### SURGICAL COMPLICATIONS.

—Staemmler, Achelis and Machol (Zentralbl f Chir 2904, 1928) state that the surgical complications include *atherosclerosis* with *gangrene*, reduced resistance to infection, and the development of *coma* in narcosis.

Oppel's attempts to influence diabetes surgically by extirpation of the adrenals and Mansfeld's attempts to treat it by ligation of the pancreatic duct have not been repeated. The surgeon must consider diabetes from 2 aspects. He must attack its complications, the inflammatory processes and *gangrene*, and must take the presence of diabetes into consideration in performing operations for other conditions. Treatment with insulin is of importance chiefly to overcome the danger of *coma*. *Infections* and *gangrene* are not cured by insulin but, especially the former, are rendered milder by it. Insulin breaks the vicious circle of unfavorable in-

fluences between diabetes and infection. The infection itself requires treatment, as does also the gangrene. The danger of other operations is considerably reduced by insulin. However, the generally lowered resistance of diabetics must be considered. Karewsky says that diabetes is not a contraindication to urgent operation, but that no avoidable operation should be performed on a diabetic.

B. L. Coley (Am J M Sc 176 491 (Oct) 1928) divides these surgical complications into 2 groups, those of election and those of necessity. Operations of election should be decided upon only after careful consideration by internist and surgeon and should be given a preoperative preparation best to fit them to withstand operation. Insulin has removed much of the hazard from operations of this type. Operations of necessity should be done as emergencies, after the infective focus is drained or removed the diabetes can be treated more effectively. Insulin should not be relied upon to abolish *hyperglycemia* and *acidosis* in the presence of an infection which has not been promptly treated surgically.

**OPERATIONS ON URINARY TRACT**—According to I. Chiofalo (J d'urol 25 11 (Jan) 1928), the patient's urine and blood are made sugar-free either by diet alone or by diet and insulin. An hour and a half before operation, from 15 to 20 units of insulin is injected. A half hour later the patient is given from 15 to 20 Gm ( $3\frac{3}{4}$  to 5 drams) of sugar, followed by an injection of morphine. Chloroform must not be used for anesthesia. The methods open to choice are ether, nitrous oxide and

spinal anesthesia, in order of decreasing danger. During the 48 hours following operation, the patient should be treated as a subject threatened with diabetic coma. He should receive sugar, water and insulin. It is best to give from 30 to 40 units of insulin in the afternoon and thereafter to examine each sample of urine excreted, giving sugar to avoid symptoms of hypoglycemia. If the operation is urgent, the patient should be given from 40 to 50 units of insulin 1 hour before operation and a half hour later a proctoclysis of 500 c c (1 pint) of fluid containing dextrose.

**MORTALITY**—The increase of surgical conditions as a cause of death in diabetes is brought out by Howard F. Root and Shields Warren (Boston M and S J 196 864 (May 26) 1927), who find the percentage very high, in 1 series of cases 71 per cent, in another 54 per cent. They urge that the public as well as the medical profession have impressed upon them that at present the diabetic's greatest enemy is surgical disease, and that in the majority of cases early, vigorous preventive and remedial measures might have prevented death.

In the diabetic patient, operation not necessitated as a complication of the disease, gives a prognosis similar to that in similar but non-diabetic patients, provided insulin is properly used, and the diet carefully supervised. After operations demanded by the complications of diabetes, however, insulin is much less effective. L. and J. L. Lapeyre (Presse méd 37 1149 (Sept 4) 1929) note that despite the use of insulin, diabetic gangrene, especially if complicated by concurrent infections, still presents a



mortality of from 38 to 40 per cent, carbuncle of 33 per cent and cellulitis of 50 per cent.

### DIARRHEAL DISEASES OF CHILDREN.—ETIOLOGY.—

Several investigators have returned to the toxin theory as the cause of diarrhea in children B Plantegna (Jahrb f Kinderh 121 156 (Sept) 1928) claimed that the toxin was produced by the colon bacillus Factors which favor its growth and probably increase its virulence are changes in the intestinal secretions, possibly caused by parenteral infections and malnutrition The name of "*colon bacillus toxicosis*" was applied to this condition Plantegna has prepared a specific antiserum by injection of colon bacilli and paracolon bacilli into horses When symptoms of toxemia occurred in infants with diarrheal diseases, he injected 20 to 30 c c (5 to 7½ drams) of this antiserum subcutaneously and if no improvement occurred, gave an additional dose of 10 c c (2½ drams) Without the use of fluid by hypodermoclysis, the skin of these infants became more elastic and less dehydrated

A Dufourt (J de méd de Lyon 10 137 (Feb 20) 1929) believed that the toxin responsible for diarrhea in infants was present in cow's milk He produced severe diarrhea in rabbits and goats by the injection of sterile filtrates of diarrhea stools This filtrate is potent even after heating for 2½ hours at 60° C but was detoxified by boiling He immunized goats with the filtrate and employed convalescent serum from them in the treatment of infants suffering from the disease Twenty-one children with diarrhea received this treatment

and Dufourt reported (Rev franç de pédiat 4 763 (Dec) 1928) 14 cures and 7 deaths as compared with 9 cures and 15 deaths in an untreated group

*Acidosis* was present in 11 out of a series of 25 children with acute diarrheal disease (B Hamilton, L Kajdi and D Meeker Am J Dis Child 38 314 (Aug) 1929) A decrease in the fixed base was observed in 14 of the group The acidosis was due to an elimination of the fixed base without a concomitant decrease in chloride by vomiting, or to an increase in base but also an increase in chloride in greater proportion

M Maizels and C B McArthur (Quart J Med 22 581 (July) 1929) also found an acidosis in 28 of their series of 48 infants with diarrhea and vomiting The remainder had a plasma bicarbonate of more than 0.028 molar, indicating an *alkalosis* Of this latter group, however, one-half excreted an acid urine The administration of bicarbonate by mouth to such infants might have had dangerous effects This combination of acid urine with an alkalosis which has been noted in other diseases has been ascribed to a retention of base because of kidney damage or decreased osmotic pressure of the blood

The investigators observed that in neutral or alkaline urines, if the ammonia coefficient was below 8 per cent or the ammonia combined acid was less than twice the titratable acid, no acidosis was present and alkalis by mouth were dangerous When the opposite conditions occurred in the presence of acid urines, still acidosis may or may not be present and there might be an alkalosis

They did not believe the prognosis

of diarrheal disease could be determined by the amount of plasma bicarbonate present in the blood

The decline in deaths from summer diarrhea has been accompanied by a disappearance of flies. G. S. Graham-Smith (J Hyg 29 132 (July) 1929) noted the steady decrease in the diarrhea death rate in England from the year 1913 to 1922 which he associated with a growing knowledge of the rôle played by the fly in transmitting the disease, improved hygienic measures and the disappearance of horse manure which served as a common breeding place for the house fly. He urged more universal disinfection of manure and garbage to further reduce the number of flies.

**DIAGNOSIS**—The various types of diarrhea in infants are differentiated with difficulty. A large number are due to specific micro-organisms, others are chiefly toxic due either to the toxin produced by micro-organisms or are the product of improper food digestion. To diagnose the latter group, R. G. Freeman, E. G. Miller and R. G. Freeman, Jr (Arch Pediat 46 269 (May) 1929) have employed simple tests on the stools of infants: the Obermayer test for indican, the Freeman and Miller test for fecal fat and the Schmidt fermentation test for carbohydrate. Eighty per cent of the children examined had an increase in carbohydrate in the stools, 60 per cent a protein increase and 33 per cent had fat in amounts above the average. The authors regulated the diets of their patients according to these excesses and reported considerable success.

**DIETARY TREATMENT.**—In the treatment of gastro-enteritis in

children almond milk has been employed by some pediatricians in Europe to replace the casein of cow's milk. A. Wittenberg (Monatschr f Kinderh 36 124, 1927) prepared the milk by adding 4 grams (1 dram) of calcium lactate to a liter (quart) of whole milk, filtering off the precipitated casein and adding an equal part of a filtered water solution of triturated almonds. To this solution maize or rice flour and sugar were added in proportions so that the resulting mixture contained 1.65 per cent albumin, 6.6 per cent sugar and 2.95 per cent fat. L. Moll (Wien klin Wchnschr 41 1249 (Aug 30) 1928) advised the use of a similar feeding for infants with diarrhea. He believed this treatment had advantages over long starvation periods, which tend to produce acidosis and dehydration, and also over feedings of breast-milk which are too poor in salts and nitrogen and too rich in fats. In breast-fed infants, this mixture may supplant 1 or 2 nursing periods. He reported a reduction in infant mortality caused by diarrheal diseases from 32 per cent to 5.1 per cent since he began to use this "calcium milk."

**DIPHTHERIA.—MORTALITY**—The mortality rate of diphtheria declined gradually from 24.3 per hundred thousand in 1921 to 7.5 in 1926 according to the statistics compiled by Gerstley, Geiger, Falk, Abt, Grulee, Norton (Am J Dis Child 35 1048 (June) 1928). Because of the fact that immunization against diphtheria was started on a large scale in 1921, the writers suggest a possible correlation between this fact and the decline in death rate.

In the year 1927, an unusually severe epidemic of diphtheria swept this continent and Europe, with a rise in the mortality rate in many countries. G. Polverini (*Riv di clin pediat* 26 409 (June) 1928) reported complications in 74 per cent of his cases of diphtheria in 1926 and 1927 as compared with 6 per cent from 1920 to 1925 and 4 per cent from 1905 to 1920. For this reason, he increased the dosage of antitoxin from an average of 12,500 units to an average of 18,500. In Germany, E. Koenigsberger (*Arch f Kinderh* 84 265 (July 20) 1928) recorded an increase in the number of deaths due to diphtheria in 1926 and 1927 and accordingly increased the dosage of antitoxin to 50,000 units. In France, an increased number of patients with paralysis following diphtheria was noted by E. Cassoute (*Bull Soc de pédiat de Paris*, 27 159 (Mar) 1929). He frequently found the streptococcus and the pneumococcus in association with diphtheria which he suggested might account for the increased severity.

He also advocated larger doses of antitoxin. H. S. Banks and G. McCracken (*Lancet*, 2 4 (July 7) 1928) reported a reduction in the number of deaths from diphtheria from 93 per cent to 26 per cent during the 12 months he employed intensive therapy. He gave 70,000 units intravenously and 30,000 units intramuscularly as a routine. If the clinical evidence of toxemia had not diminished by the end of 24 hours, he repeated the dosage. One patient received a total of 250,000 units.

**IMMUNITY.**—The advantages of anatoxin or toxoid preparations over toxin-antitoxin mixtures for active

immunization have been listed by G. Ramon and G. I. Helie (*J. A. M. A.* 91 1028 (Oct 6) 1928). They claimed (1) that the toxoid is easier to prepare and to store, (2) accidents have happened with toxin-antitoxin because of dissociation of toxin and antitoxin due to cold or technic of preparation, (3) toxoid produces immunity in less time than toxin-antitoxin, (4) the serum in toxin-antitoxin mixtures sensitizes the patient to this protein, making subsequent injections of serum dangerous—toxoid contains no such protein. W. H. Park and M. C. Schroder (*Am. J. Pub. Health* 18 1455 (Dec) 1929) answered Ramon and Helie by stating that they believe toxin-antitoxin is not harder to prepare and that the 2 or 3 accidents which have occurred were entirely avoidable. More than a million injections of T. A. T. with good results attest the harmlessness of this method. They claim that the only tenable objection to toxin-antitoxin is the development of sensitivity to horse serum and this has been eliminated by the substitution of goat serum toxin-antitoxin of equal potency.

George F. Dick and Gladys H. Dick (*J. A. M. A.* 92 1901 (June 8) 1929) compared the value of the 2 preparations by immunizing about 200 Schick-positive persons. Ninety-four per cent became immune after 3 doses of the Ramon toxoid and 82 per cent after 5 doses of toxin-antitoxin. They believe that the majority of the reactions in adults following injection of toxoid are due to the protein of the veal broth with which it is prepared.

G. F. Weinfeld and M. Cooperstock (*Am. J. Dis. Child* 38:35 (July) 1929) obtained a higher per-

centage of negative Schick reactions (92 per cent) with the use of 2 injections of toxoid in the immunization of 104 adults, than the reported figures on the use of toxin-antitoxin. Twenty-five per cent of 205 patients had reactions, of which 92 per cent were local only and 107 per cent were general systemic reactions of different degrees of severity.

Another method of diphtheria *prophylaxis* has been advocated within the last year by E. Loewenstein (Wien klin Wchnschr 42 193 (Feb 14) 1929). A culture of diphtheria bacilli detoxified with 0.4 per cent formaldehyde and incubated for 3 weeks was made into an ointment which was applied to the skin of guinea-pigs. An increased antitoxin content in the blood was produced. Inunctions given to 400 Schick-positive children rendered 70 per cent Schick-negative. Similar results were obtained by H. Baar and A. Grabenhofer (Wien klin Wchnschr 42 930 (July 11) 1929) who gave 2 to 5 inunctions 7 days apart and obtained 67 per cent negative Schick tests among 203 susceptible children. B. Schick and A. Topper (Amer J Dis Child 38 929 (Nov) 1929) observed that 6 months after tonsillectomy and adenoidectomy, many children who had been Schick-positive became Schick-negative. This is a more rapid rate than statistics give for acquisition of natural immunity. They were not prepared to advise tonsillectomy on this basis and they strongly urge a continuation of active immunization with **toxin-antitoxin**.

**PATHOLOGY AND COMPLICATIONS**—Diphtheria injected into dogs caused a delay in the removal of

sugar from the blood, and diminished the action of insulin, according to R. E. Netzley (Am J Dis Child 37 511 (Mar) 1929). *In vitro*, diphtheria toxin does not influence insulin action unless the 2 are incubated together for 18 hours at a temperature of 37°.

P. Lereboullet, M. David and Donato (Arch de méd d enf 31 709 (Dec) 1928) demonstrated a lowering of the cholesterol content of the blood in 75 per cent of malignant diphtheria infections within the first 3 or 4 days of the disease and frequently a low level remained for the next 10 days. In patients who died, there was a marked decrease of cholesterol.

C. Farmakidis reported 7 instances of agranulocytosis among diphtheria patients all of whom recovered (Presse méd 37 1121 (Aug 28) 1929).

The association of streptococci and diphtheria bacilli has been observed by F. Meyer (Deut med Wchnschr 54 215 (Feb 10) 1928) and H. Finkelstein and E. Königsberger (Deut med Wchnschr 54 218 (Feb 10) 1928). The former obtained a hemolytic streptococcus from a number of cases of malignant diphtheria. This micro-organism also produced a toxin which was very destructive to heart muscle and the liver, and produced signs of a hemolytic anemia. When streptococcus antitoxin was given in addition to diphtheria antitoxin, the mortality rate declined. P. S. Rhoades (J Infect Dis 41 377 (Nov) 1927) discovered a hemolytic streptococcus in the nose and throat secretions of 100 persons suffering from diphtheria. In 16 instances the micro-organism belonged to the scarlet fever strain and in 13 it was non-specific.

Previous investigation regarding the effect of diphtheria toxin on the heart has been corroborated by R. M. Stecher (Am Heart J 4 545 (June) 1929), who demonstrated, with electrocardiographic tracings, a dissociation of the action of the ventricles and auricles. H. J. Stewart (Arch Path 7 767 (May) 1929) reported a diminution of the size of the hearts of dogs following lethal doses of diphtheria toxin. Other investigators have claimed that vasomotor paralysis is more important than heart failure in causing circulatory collapse.

C. W. Edmunds and F. D. Johnson (J A M A 90 441 (Feb 11) 1928) observed a relaxation, following toxin injections, of the splanchnic vessels in experimental animals. They believe that the blood accumulates here, the blood-pressure falls and the heart and the medulla suffer from lack of blood supply. The beneficial effect of adrenalin, added fluids and glucose is brought about by increasing the volume of the blood and forcing it back to the heart which is usually competent to restore circulation.

**CARRIERS**—Recent statistics on the incidence of diphtheria carriers were furnished by A. Kollmann (Arch f Kinderh 86 185 (Feb 22) 1929). Of 3062 children studied between 1920 and 1928, 13.6 per cent were carriers. Thirty-eight per cent of this number were newly-born babies. Carriers were more numerous in the autumn, winter and spring months and when the number of carriers increased, there followed about a month later, an increase of cases of clinical diphtheria. The incidence of carriers was higher among infants

suffering from intestinal disturbances and nasal discharges. Various methods of treatment were tried by Kollmann and he concluded that applications of 2 per cent silver nitrate to the nose and throat was the most effective. W. C. Harvey (Lancet, 2 58 (July 14) 1928) recommends an alkaline douche as the best treatment for nasal diphtheria carriers.

L. W. Cann and R. J. Cann (Guy's Hosp Rep 79 365 (July) 1929) tried for 2 years to treat carriers in a special out-patient dispensary. They employed autogenous vaccines of the Klebs-Löffler bacillus. They frequently advised the removal of tonsils, adenoids and nasal obstructions and used various solutions as local applications. A large number of carriers refused to attend the clinic or failed to report regularly and conclusions could not be drawn. They consider the out-patient system an impractical means of decreasing the carrier incidence.

Whether Schick-negative persons develop clinical diphtheria is a question of growing importance. A. V. Neale (Lancet, 2 1342 (Dec 29) 1928) observed 2 nurses who were Schick-negative but developed sore throats with thin membranes. From the throat of 1, a virulent diphtheria bacillus was isolated but 2 patients under the care of that nurse developed clinical diphtheria within a short time. The nurses showed no evidence of toxemia, received no antitoxin and made uneventful recoveries. R. A. O'Brien, C. C. Okell and H. J. Parish (Lancet 1 149 (Jan 19) 1929) reported only 18 light attacks of diphtheria among 20,000 Schick-negative patients. They believe that such persons developed sufficient antitoxin

in their blood shortly after the beginning of the infection. The writers also are aware that about 10 per cent of Schick-negative persons lose their immunity, according to the figures of W. H. Park (*Am J Dis Child* 32 709 (Nov) 1926).

**DRUG ADDICTION.** See NARCOTIC ADDICTION

**DUODENUM.—X-RAY DIAGNOSIS OF CHRONIC DUODENAL STASIS.**—This subject is discussed by B. P. Widmann (*Pennsylvania M J* 32 631 (June) 1929). No definite clinical picture is recognizable, and the necessity of co-operation of roentgenologist and surgeon is evident. The recurrence of symptoms suggestive of partial high obstruction, or chronic digestive disturbance not typical of ulcer or biliary calculus, requires x-ray study. The large number of possible causes—adhesions, pressure from enlarged mesenteric glands, aberrant, or normal, partially occluding vessels, duodenal mesentery, permitting unusual mobility, tumors, visceroptosis, make x-ray recognition of the individual specific cause usually impossible. Exploratory examination must determine the individual etiology and treatment. Where stasis is recognized by x-ray, and duodenal dilatation found on exploration, the establishing of a duodeno-jejunal stoma is recommended by S. L. Minz, De Vadder, Revel (*Bull et mém Soc nat de Chir* 54 182, 1928). In reporting a group of cases where compression was caused by enlarged mesenteric glands Navarro advised removal of the glands only. The possibility of gland recurrence suggests the advisability of the protective duodeno-jejunal stoma as an additional measure.

**INTUSSUSCEPTION.**—The possibility of successful non-operative treatment of early intussusception is brought up for consideration by G. M. Retan (*Am J Dis Child* 33 765 (May) 1927, and *New York State J M* 28 140 (Dec) 1928) and V. R. Stephens (*Am J Dis Child* 35 61 (Jan) 1928). Emphasis must be laid on the necessarily limited applicability of the method, because of the requirement of an early diagnosis, and of the recognition of the fact that the ileocolic variety cannot by this method be successfully treated. The essentials are as follows. The work is done by hand manipulation under fluoroscopic control. Curative pressure is not produced by elevation of the opaque enema reservoir, but by hand manipulation after the lower bowel has been dilated by the barium mixture at no greater elevation than 4 feet. With reflux of material prevented by gentle hand compression over the bowel in the left iliac fossa (Retan), or by clamping the enema tube (Stephens), pressure is produced by gentle hand manipulation just below the apex of the intussusception. If manipulation is successful the gradual recession of the mass is observed on the screen, each recession being immediately followed by the introduction of more enema material to maintain the pressure, and by the onward movement of the manipulating hand. Success can be considered as attained only if free flow of fluid through the ileocecal valve is observed, and immediate complete clinical relief obtained.

With recognition of limitation of use to early cases, the practice of utmost gentleness in manipulation and reasonable limitation of duration

of manipulation, the method is worthy of trial, Retan affirms that anesthesia is unnecessary. But the stage must always be set for immediate operation in the event of failure, or in the absence of a trained roentgenologist or adequate equipment.

**DIVERTICULÆ AND DIVERTICULITIS.**—Recognition of colon and sigmoid diverticulæ, and the occasional sequel diverticulitis, is more frequent. A large proportion are incidental findings in routine gastro-intestinal examinations. W J Mayo (Brit M. J 2 574 (Sept 28) 1929) records an incidence of 5.89 per cent in routine studies over a period of 5 years, and calculates the sequel of diverticulitis as probably no greater than 12 per cent in the group. The etiologic factors are difficult to recognize. A direct effect by constipation is not evident, because of the much higher proportion of males affected.

With the recognition of the presence of diverticulæ (diverticulosis), or of its antecedent "pre-diverticular stage" as described by E I Sprigg (*ibid*), attempt to lessen the tendency to impaction in, and possible consequent inflammation of, the diverticulæ, should be made by prescription of low cellulose diet, the regular use of paraffin oil by mouth, and frequent employment of enemata at low pressure. In the presence of mild degrees of inflammation the same measures are recommended, because of the frequent attending successful outcome.

When inflammation is more active or long-continued operation may be needed, though here too the note of conservatism is sounded, because of the usual regression of the peri-diverticular inflammation, and return of bowel function with lumen restora-

tion, under the rest influence of colostomy or cæcostomy. Where internal fistulæ are present the surgical problem is serious if not grave, involving multiple fistula repair, resection, or both. Mayo (*loc cit*) again calls attention to the value of isolation of the repaired large bowel from the other repaired sites by interposition of the omentum.

**DYSPNEA, CARDIAC.**—Dyspnea is distinguished from polypnea in cardiac cases by L Gallavardin (Lyon med 143 313 (Mar 17) 1929).

Polypnea is described as a normal reflected increase of both the number and the volume of the respirations due to a demand for increased oxygenation during exercise. Subjectively, it is expressed by breathlessness usually without pain, and it becomes pathologic only when caused by slight exertion.

Subjectively, dyspnea is characterized by a feeling of suffocation and more or less pronounced precordial or irradiated painful sensation. The mental or nervous condition of the patient is more important in producing dyspnea than is exertion. Dyspnea and polypnea may be observed on exertion in the same cardiac patients, simultaneously or in succession, depending on the predominance of myocardial or vascular disturbances of the heart.

Thirty observations on the arterial carbon dioxide pressure have been made by F R Fraser, C F Harris, R Hilton and G C Linder (Quart J Med 22 1 (Oct 1928) in 17 cases of heart failure with dyspnea. The results were quite variable. From a consideration of the oxygen saturation, carbon dioxide capacity, and  $pH$

of the arterial blood, and of the condition of the patients at the time of observation, it appears that, in cardiac dyspnea, there must be a stimulus to the respiratory center, independent of the quality of the blood supplied to the center, causing increased pulmonary ventilation with a

lowering of the carbon dioxide pressure in the arterial blood. This stimulus may be due to low oxygen tension in the tissues of the center, the result of lowered minute volume of the circulation, or raised carbon dioxide pressure as seen in patients with an added pulmonary disease.

## E

**EAR.**—According to J S Fraser and E D D Davis (Proc Roy Soc Med (Sect Otol) 22 85 (July) 1929), 7 varieties of *malformation* of the auricle are seen. The pointed ear, the auricle in which the helix hangs down like a flap, the auricle with a split lobule or no lobule, the cat ear, the auricle with a longitudinal swelling, the microtic ear in which the auricle is displaced downward over the mandibular joint or onto the cheek, and the ear without an auricle. The external auditory meatus may be occluded by connective tissue or bony atresia. In the middle ear, the ossicles may be malformed, and the tendinous attachments of the tensor and stapedius may be misplaced.

Reconstructive surgery of the ear has been very unsatisfactory in the hands of most skilled operators, and other methods, such as prosthesis for the reconstruction of ears, have been attempted successfully, as is done by F L Lederer (Arch Otolaryng 8 531 (Nov) 1928). His prosthesis was made of gelatin, glycerin, and zinc oxide.

*Injuries* to the auricle are common but the formation of *othematoma* is of very rare occurrence, especially in children. M Yoel (Arch internat. de laryng 35 446 (Apr) 1929) reports

a case in a 7-year-old child who received a blow on the ear in a quarrel with another child. The following morning the parents noticed a reddish, soft tumefaction of the auricle of the right ear the size of a small apple. Two days later the patient received another blow on the same ear and thereafter the tumor became 5 times its former size. At the end of 15 days, after the continuous application of **heat**, the tumor opened and discharged first coagulated blood and then a large quantity of sanguineous serum.

It is in the detailed examination of all parts of the drum that more accurate diagnoses are made, particularly in those cases where a minute *perforation* exists in Schrapnell's membrane, so frequently overlooked and which so often means attic suppuration. The development of otomicroscopy is a distinct advance in this field and should find particular enthusiasm among those who teach otology. E Luscher (Arch internat. de laryng 35 302 (Mar) 1929) states that with the instrument, a magnification of from 10 to 50 diameters may be obtained with ordinary light. The examination is binocular and 2 persons can view the enlarged image at the same time. Atrophy and perforation



of the tympanum are differentiated without difficulty. The edges of a perforation will show very readily whether the lesion is old or recent. Of interest is the circulation in the drum membrane and middle ear, which can be studied in great detail with otomicroscopy.

*Congenital anomalies* in the *middle ear* are of importance, particularly those cases which have dehiscences in the floor of the tympanum and in whom the jugular bulbs have been incised when myringotomy was done. A case of double traumatic injury of the *jugular bulb* was reported by G. H. Boyce (J. A. M. A. 91: 2064 (Dec. 29) 1928) in which a girl of 13 presented herself with a diagnosis of bilateral acute otitis media. Incision, from below up, in the lower posterior quadrant of right drum was followed immediately by profuse bleeding. The auditory canal was packed with gauze. While the patient was still under anesthesia, the other drum was incised, but this time the incision was made anterior to the malleus handle, about the junction of lower and middle third of the drum, and was carried upward. Severe hemorrhage followed in this ear also, and the canal was packed. The packs were left in for 24 hours and then removed. After cleaning the canals, they were re-packed and the packing removed the next day. On the second day following the procedure, severe bleeding began which necessitated packing the canals again and the packs were allowed to remain for 2 days more. Bleeding finally stopped and when the patient was examined 2 months later the perforations in the drums had healed and the hearing was as good as ever.

Another anomaly which leads to troublesome symptoms is *congenital arterio-venous fistula in the tympanum*. F. Smith (Arch. Otolaryng. 10: 32 (July) 1929) reports a case of a *fistula* of the *jugular bulb* and the *internal carotid artery*. The patient complained of deafness and a constant pounding noise in the right side of the head had been present since childhood. There was total absence of the bony floor of the tympanum and the external canal. A pinkish-blue pulsating mass presented in the external canal. When the patient was 24 years of age, a spontaneous hemorrhage from the right external canal occurred, which was controlled by packing. The patient was operated on and the right lateral sinus obliterated, with ligation of the jugular vein and several large veins in the region of the carotid sheath. Two secondary operations were required before the patient was completely cured.

In this day and age, with thousands of automobile accidents, as well as the number of airplane mishaps, it is necessary to understand all types of *ear injuries* arising from fractures of the skull. E. D. Davis (Brit. M. J. 2: 741 (Oct. 27) 1928) states that an aural examination should be made immediately after a skull fracture. In the majority of basal skull fractures the middle fossa is involved, and when this is the case, the Eustachian tube is apt to be injured. He believes that fracture of the internal ear and labyrinth is rare. Profuse and prolonged bleeding from the external ear indicates hemorrhage from the middle meningeal artery or rupture of the lateral sinus. In cases of hemorrhage from both ears the mortality is about 66 per cent, while in those with

hemorrhage from 1 ear it is about 39 per cent. The presence of suppuration in an ear at the time of injury adds to the seriousness of the condition very considerably.

Of interest to the student of otology is the ever repeated question as to how infection enters the middle ear, and anything that throws light on the relationship of upper respiratory tract and middle ear infections is warmly received. In studies made by J. H. Fisher (*J. Infect. Dis.* 44: 33 (Jan.) 1929) the pathogenicity of isolated bacteria in 15 of the 46 cases of middle ear infections which he studied bacteriologically was tested by intranasal inoculation of rabbits. Of the 11 rabbits that died, in each case there was an acute purulent paranasal sinusitis and an acute otitis media. From these lesions, an organism similar to the type inoculated was recovered in each instance. The experiments were controlled by 2 groups of rabbits, none of which died.

**ECZEMA. — ETIOLOGY.** — Eczema continues to be one of the great problems in dermatology. The factors underlying its development are still far from determined. B. Usher (*Arch. Dermat. and Syph.* 18: 423 (Sept.) 1928) has carried out experimental investigations on the alleged causal relationship between eczema and lowered sugar tolerance. The blood sugar time curves in a series of patients with eczema were compared with those in a series of non-eczematous subjects. The curves were altered in 54.7 per cent of the former group as compared with 38 per cent. of the latter. The incidence of diminished tolerance for sugar was the same in both groups. In

those with eczema, however, the incidence of delayed assimilation was much greater than in the non-eczematous individuals, namely, 40.5 per cent., as compared with 20 per cent. Intradermal and contact tests with dextrose in 50 consecutive eczematous cases, in whom the sugar tolerance was known, gave negative results. The presence of a disturbed carbohydrate metabolism does not seem to increase the sensitivity of the skin to chemical irritants. The author believes that, since sweat is an ideal culture medium and bacterial growth varies directly with its sugar content, it may be possible that, in at least some individuals with a disturbed carbohydrate metabolism, pathogenic organisms normally present on the skin surface become activated and exert effects.

O'Keefe and Rackemann (*J. A. M. A.* 92: 883 (Mar. 16) 1929), in classifying the causes of eczema mention toxic, metabolic, and allergic factors. Their report is concerned only with the allergic type of eczema and its relation to the application of the theory of hypersensitiveness. They studied 239 cases of eczema in children and found that 56 per cent of infantile eczema begins during the first 4 months of life, and 95 per cent before the end of the second year. Skin tests with food and dust allergens were positive in 52 per cent. The cases which were complicated by asthma showed 88 per cent positive skin tests as well as a tendency toward multiple sensitization. In all the positively-reacting children, egg, wheat and milk formed the chief sensitizing foods. Eliminating these foods in the sensitized patients gave improvement in 83 per cent of the

cases Empirically removing the same foods from the diet of the test-negative patients gave improvement in 38 per cent Dusts were found to be rare as causative factors among children

G B Dowling (Brit M. J. 2 947 (Nov 23) 1929) states that in the stained scale of seborrheic dermatitis one can always see the spore of *Malassez*, but never any other fungus He regards this as the strongest possible evidence in favor of its etiological significance

From dandruff a fungus can be cultivated which, when implanted on the skin, produces a condition clinically indistinguishable from seborrheic dermatitis It can be recovered from the artificial lesion by culture, and may be seen in a scraping of the lesion This fungus he believes to be the spore of *Malassez* Thus, is the opinion held by Sabouraud, Unna and others substantiated that seborrheic dermatitis is a fungus disease

K Hansen (Tidskr f d Norske Laege 215 (Mar 1) 1928) records 3 cases of eczema due to idiosyncrasy to quinine

Orbicular eczemas have been studied in particular by Moses Scholtz (California and West Med 29 276 (Oct) 1928) Such eczemas may involve one or both of the eyelids or supra- and infra-orbital regions There are, at least 4 different types of orbicular eczemas (1) The type developing secondarily to some ocular disturbance, associated with profuse conjunctival discharge, (2) extension of blepharitis, (3) seborrheic, (4) pyogenic infection

**TREATMENT.**—K Scheer (Mun-chen med Wchnschr 75 852 (May 18) 1928) reports a series of 14 cases

of eczema in children treated successfully with hydrochloric acid-milk.

Moses Scholtz (Arch. Pediat. 44: 601 (Oct) 1927) states that crude coal tar and naphthalin are the least irritating and most effective drugs in chronic infantile eczema.

W T Sack (Dermat Wchnschr. 86 821 (June 23) 1928) states that ephetonin is of definite therapeutic value in the treatment of eczema This agent is a synthetic alkaloid, an equivalent of the more expensive ephedrin Both clinically and pharmacologically it closely resembles adrenalin, but has the advantage of acting when administered orally. The author is impressed with the rôle the autonomic nervous system plays in the production of eczema Owing to the action of the preparation on the parasympathetic and the fact that it has already been used successfully in the treatment of asthma, he decided to test its value and after trial in 20 cases, he concludes that it has a definite therapeutic value

Variot (Arch de med d enf 32 255 (May) 1929) recommends homogenized and overheated milk, a mild laxative, and a soothing ointment after a starch bath, *for eczema of infants*

Szego (Zentralbl f Gynak 52 1593 (June 23) 1928) reports a number of cases of chronic and acute eczema in which there was ovarian disturbance Ovarian extract given by intravenous or intramuscular injection was found effective in relieving both the ovarian disorder and the skin condition

F L Burnett (New England J Med, 199 321 (Aug 16) 1928) states that eczema and psoriasis are metabolic disorders, and may be relieved

by noting and correcting factors in a patient's mode of living which are tending to encourage the further inroads of early and slight metabolic disorders as shown by the indices of absorption

The chloride content of the whole blood was estimated by Burgess (Arch Dermat and Syph 20 59 (July) 1929) in a series of cases of eczema and was found to be within normal limits. There would appear to be no indication for attempting to reduce the chloride content of the blood in the treatment of patients with eczema.

**EDEMA.—ETIOLOGY**—Views on the edema of cardiac and renal disease are undergoing slight modifications because of newly discovered facts in relation to the edema produced by diets. It is not possible to generalize even in any one specific disease such as nephritis. For instance, withholding of proteins for nephritics must be carefully weighed in the balance, for harm may be done in certain cases by this regimen. *War edema* has become fairly well known as an entity. Also called war dropsy or nutritional edema, it was a striking manifestation wherever there was famine. At first it was attributed to a lack of certain vitamins, but clinical observations, especially on infants fed on carbohydrate diets, and experiments on rats have shown that a diet deficient in proteins but otherwise adequate leads to water retention. Further studies showed that a low serum protein content was responsible, at least in part, for this edema, furthermore the feeding of adequate protein brought about prompt disappearance of the symptom. Naturally,

the water intake is also of importance, edema will not develop even if the serum proteins are low, if the water intake is much reduced. The application of these findings in various edemas are of considerable practical use.

**TREATMENT**—Goldring (Arch Int Med 44 465, 1929), in a study of 46 cases presents results of interest in the therapeutics of the edema in congestive heart failure. After a preliminary period of about 5 days, or until rest alone would not diminish their weight any further, **digitalis** was given to mild toxicity. It was then discontinued for 1 or 2 days to be resumed at a maintenance dose. Fluid was limited to 1200 cc (2½ pints) daily and salt was restricted. When no more results were obtained from digitalis (7 to 10 days) the study of various diuretics was begun. Urea could not be used because of vomiting. Calcium chloride and calcium lactate (4 to 12 Gm—1 to 3 drams—daily) both orally and intravenously, was ineffective but it is quite active in nephritic edema. Ammonium chloride had no effect, merbaphen was of limited value, combination of the 2 produced quick and dramatic effect in 14 patients. Synthetic theophylline was quite effective. Diuretin was of little value. All told, diuretics were active in about half of the patients. The rheumatic cases obtained the greatest benefit. Even so, whether edema was relieved or not, only 1 patient lived longer than 6 months.

That edema can have an endocrine origin, especially thyroid, is reflected in a number of case reports. Usually the edema is of peculiar and special distribution. Thus in a case

reported by Apert and Bach (Bull. méd 42 628, 1928) edema of the face occurred in a girl, aged 3 years, Pagniez and Roquès (Bull et mém Soc de hôp de Paris 52-268 (Feb 23) 1928) observed swelling in the 4 extremities Treatment with **thyroid extract** (about 0.2 Gm—3 grains—daily) relieved the condition in a few weeks Cessation was followed by return of the symptoms Finally, after prolonged treatment, the edema failed to return when the administration of thyroid was discontinued

**ANGIONEUROTIC EDEMA**—Dunlap and Lemon (Am J Med Sc 177 259, 1929), writing on the hereditary type of angioneurotic edema, report a family of 24 members in 4 generations Six members died suddenly, 2 from undoubted edema of the glottis, 2 from some sort of gastro-intestinal colic, 1 from dropsy and 1 from heart disease Although they throw no new and important light on the problem, nevertheless, a study of blood volume and of the capillaries in 3 other cases is of interest No difference was found in these cases from the other, nor from normal individuals

In a review of various ideas on the subject, they bring out the fact that there are 4 types of manifestation, namely, angioneurotic edema (1) of the skin, (2) of the larynx, buccal cavity and face, (3) of the bronchi, (4) of the gastro-intestinal tract In involvement of the larynx and glottis there is a real danger to the patient, suffocation and death soon occur unless relief is given in a few minutes Stated in figures, there is about a 6 per cent chance of death in an attack Mistaken diagnosis in the gastro-intestinal variety is quite possible, for

colic, with more or less continuous pain in the interims, is very common.

**GAS EDEMA**—Studies by various workers have shown that the x-rays can be of great help in the early diagnosis of gas edema Plates of the extremities may show bubbles of gas before the characteristic crepitation can be felt Apparently the number of cases of this serious disease is increasing in civil practice. One of the reasons is possibly the increase in the number of street accidents Stress is laid on the early administration of sufficient doses of good serum. It is interesting to know that Fessler (Deutsche Zeitschr. f. Chir 215 248, 1928) never saw a gas-edema in the Boer War or Greco-Turk War and believes it was because the battles were fought on rocky or dry sandy ground.

**ELECTRO-PHYSIOLOGY.**—In a preliminary report C A Neymann and S L Osborne (Illinois M J 56 199 (Sept) 1929) present some interesting points on the production of artificial fever by high-frequency currents It has been found that high-frequency currents can produce an increase in temperature in live animal tissue Production of artificial fever was borne in mind as a treatment in certain cases of infectious type, chronic ailments and in general paresis Further experimentation must be carried out

R H Jaffe, D Willis and A Bachem (Arch Path 7 244 (Feb) 1929) conclude that severe arterial changes are frequently found in the vicinity of *electrical burns* due to the heat and are non-specific for the action of electric current

J W Schereschewsky (Pub Health Rep 43 927 (Apr 20) 1928) found that very high frequency currents may produce a marked and immediate effect on normal sarcoma cells The result is a coagulation necrosis, and rapid solution of the cells seems to occur at times

Death from electricity, whether from lightning or from electric current, is, in

Jellinek's opinion (Monatschr ungar Med 2 227, 1928) in most cases apparent rather than actual. He urges long continued **artificial respiration** and notes that this is sometimes successful after the physician has pronounced the patient dead.

P Schneider (Wien med Wchnschr 79 53 (Jan 5) 1929) cites the case of a man who came in contact with a 5,000 volt electric current and appeared to be dead. Artificial respiration was started a few minutes later, and a lumbar puncture was made about 1 hour after the accident. The spinal fluid was under heavy pressure. Death was caused by cerebral paralysis which suspended the heart action. He recommends that **artificial respiration** should be started at once, and intracerebral pressure should be relieved as early as possible by lumbar puncture.

### ELECTROTHERAPEUTICS.—

H Heusser (Schweiz med Wchnschr 59 250 (Mar 2) 1929) uses *ionotherapy* extensively in skin diseases, some diseases of the articulations, **neuritis** and for local **analgesia**. For cosmetic surgery, **cauterization of the skin**, **excision of scars**, **skin grafts** and the treatment of **telangiectasis**, the local anesthesia produced by means of *cataphoresis* with a 2 per cent *cocaine solution* is better than the anesthesia produced by infiltration or subcutaneous injections, because it does not cause edema of the skin, which is very important, especially in cosmetic operations. The *cataphoresis* with copper sulphate solution is used for the abortive treatment of **furuncles**, the *cataphoresis* with iodine and salicyl solutions in the treatment of **keloids**, **calluses** and **corns**, give more rapid results than the other methods of treatment.

W Baensch and R Finsterbusch (Strahlentherapie 33 399 (Aug 26) 1929) used *cathode rays* in the treatment of diseases of the **skin**. They obtained good results particularly in **cancroids**, **lupus exulcerans**, **verrucous tuberculosis**, **chronic eczema**, **warts** and **localized psoriasis**.

*Electrosurgery* is a valuable therapeutic aid in certain conditions such as premalignant and malignant neoplasms and the various **granulomata**, according to E W Kime (New England J Med 200 532 (Mar 14) 1929). **Electrodesiccation** and

**electrocoagulation** are employed. The former is uniterminally applied, the latter biterminally applied. *Electrodesiccation* is indicated as useful for **pre malignant** and **low malignant lesions**, especially those located about the **eyelids**, **face**, **nose** or **ears**, or in other areas where scar tissue must be preserved. The advantages of electrosurgery are as follows: (1) the operation is quickly performed since little time is lost in obtaining hemostasis, (2) most operations may be done under local or regional anesthesia, (3) post-operative shock and pain are very slight or absent, (4) the operation causes little blood loss and less acidosis, (5) the desiccated wounds heal without a scar.

W B Snow (Amer Med 35 723 (Nov) 1929) draws the following conclusions on the value of *static electricity* in therapy: (1) The peculiar effects are derived from the fact that it is a direct or constant current of high potential and therefore possesses characteristic qualities of the constant current in inducing direct muscular contraction of the muscle cells, (2) the mechanical removal of infiltration from engorged tissue where no infection is present. It overcomes muscular contraction associated with inflammatory processes. It improves local and general metabolism.

**EMBOLISM — ETIOLOGY** — That embolism is caused by infection of a predisposed individual with an unknown organism is the hypothesis of O Loewe (Munchen med Wchnschr 75 1163 (July 6) 1928), after reviewing the statistics of the increase in embolism in Germany and elsewhere. However, W Stohr and F Kazda (Deutsche Zeitschr f Chir 208 105 (Feb) 1928) from the study of necropsy material conclude that it is not justifiable to speak of special predisposition.

Post-operative thrombosis and embolism, according to F Detering's research (Beitr z klin Chir 144 416 (Oct 15) 1928), embracing from 1919 to 1927, have increased mostly fol-

lowing operations upon gall-bladders and stomachs, and especially upon varicose veins. Women and persons of advanced age are most susceptible.

A discontinuance of vessel clamps by A. Calmann (*Zentralbl f Gynak* 52:2346 (Sept 15) 1928) has lessened the number of cases of emboli. In 131 abdominal operations when he still used clamps, there were 9 cases of thrombosis with 2 deaths from pulmonary emboli. In his last 131 cases without the use of vessel clamps, he has had only 2 cases of thrombosis with no deaths.

In discussing sudden post-operative death, E. Santoro (*Riforma med* 44:244 (Mar 5) 1928) does not think that embolism is always the cause, even if examination reveals no change in the cardiovascular system. He suggests the possibility of cardiac paralysis and cerebral hemorrhage.

That embolism may be aseptic is shown by O. Cantelmo (*Riforma med* 43:1120 (Nov 21) 1927) in his report of 5 cases of fulminant post-operative embolism.

A case of post-operative embolism with recovery is reported by Lutaud (*Bull et mém Soc de chir de Paris* 20:874 (Dec 21) 1928) who injected epinephrine intracardially, 10 days after a successful laparotomy.

The increased use of intravenous injections and the extensive life-prolonging treatment of patients with chronic heart disease is given as the reason for the increased incidence of thrombosis and embolism in Germany from 1924 to 1927 by J. K. Kuhn (*Mitt a d Grenzgeb d Med u Chir* 41:329 (May 17) 1929). However, C. H. Adolph and R. Hopmann (*Med Klin* 24:1792 (Nov 16) 1928) refute this claim in that they found

more cases of emboli in patients not treated by intravenous injections than in those so treated.

Two cases of arterial embolism following the intramuscular injection of potassium bismuth tartrate are cited by J. A. Gammel (*Arch Dermat and Syph* 18:210 (Aug) 1928). Care should be taken that the needle is not in a blood-vessel by first aspirating.

A case of pulmonary embolism in a girl aged 11 months is reported by J. K. Stulik, Jr and B. K. Rust (*Am. Jour Dis Child* 37:1246 (June) 1929). The disease began with infection in the upper respiratory tract. An anatomic diagnosis was made at necropsy. Another case of pulmonary embolism, following fracture of the tibia and fibula is reported by V. Cotton-Cornwall, C. W. Ponder and W. H. Evans (*Brit M J* 2:789 (Nov 3) 1928). Six weeks later, after apparent good union, the patient suddenly expired, after complaining of feeling ill at ease during the previous day. At autopsy, a clot about the size of the lumen of the iliac vein was found in the right ventricle and pulmonary artery.

**FAT EMBOLISM.**—Experimental fat embolism is discussed by E. P. Lehman and R. F. McNattin (*South M J* 22:201 (Mar) 1929). They injected dogs intravenously with cotton-seed oil, 12 to 15 c.c. per kilogram. Their findings indicate that ether pneumonia and post-operative lung abscess may be initiated by the disturbed pulmonary circulation caused by fat embolism. The same authors (*Arch Surg* 17:179 (Aug) 1928), in a series of 50 post-mortem examinations of lung tissue available in unselected cases, found that fat embolism occurred in more than half of

all the lungs examined. They conclude that fat embolism occurs in half of the miscellaneous fatal diseases without the history of trauma, and they conclude further that the condition is extremely common in all kinds of cases, traumatic and non-traumatic.

**AIR EMBOLISM** — A case of fatal air embolus, due to inflation of the urinary bladder with air preliminary to operation, is reported by C P Mathé (*Surg, Gynec and Obst* 48 429 (Mar) 1929). At autopsy, there were found bubbles of air in the iliac veins, mesenteric vessels, vena cava, and renal veins. The lungs, liver and right chambers of the heart were filled with a froth of air. An adenocarcinoma at the base of the bladder had allowed the entry of the air into the veins. The author, therefore, concludes that this method should be discontinued and the use of harmless sterile water and mild antiseptic solutions substituted.

That artificial pneumothorax may be a cause for arterial air embolism is the opinion of G Liebermeister (*Klin Wchnschr* 8 21 (Jan 1) 1929) who observes as the first indication of this an anemia of a more or less extensive area of the tongue. He explains this because of the fact that in the position assumed for this operation the artery which leads to the tongue is the first one to receive blood from the aorta and, therefore, the first one to show the presence of an air embolus. The practical value of the observation is that it makes it possible to discontinue the gas injection immediately and prevent a greater complication. This danger is reported by Felix Baum (*Am Med* 22 271 (May) 1927) who, upon a series of 2472 gas fillings for

pneumothorax, during 3 years observed 15 cases of air embolism.

**EMBOLECTOMY.** — Arteriotomy, with removal of the obstructive embolus, has been performed 4 times in 3 patients by J de J Pemberton (*Ann Surg* 87 652 (May) 1928). The vessels involved were the common femoral, the aorta at its bifurcation, the common iliac and the superficial femoral. One patient survived, 1 died from shock, and 1 from pneumonia. The author upholds the principle of the operation.

In a review of 118 cases and a detailed report of 12 cases, the operation of embolectomy is discussed by M Petitpierre (*Deutsche Zeitschr f Chir* 210 184, 1928). The discussion is upon embolism of the extremities only, and the author comes to the conclusion that the operation gives success in early cases and is worthy of wider use. Similarly, M Danzis (*Ann Surg* 87 667 (May) 1928) in a review concludes that early diagnosis and prompt surgical measures are essential for successful results. Likewise, E Key (*Zentralbl f Chir* 54 2190 (Aug 27) 1927) in a review of the Swedish literature, found 95 cases reported. The author thinks that arteriotomy is best done by beginning at the upper end of the embolus thereby preventing secondary narrowing after the suture.

Embolectomy was done in the upper part of the right brachial artery by F H Wiese (*Minnesota Med* 12 254 (May) 1929) with good results. The patient died, however, 7 weeks later, from pneumonia.

Two cases are reported by H Koster (*Am Jour Surg* 6 306 (Mar) 1929), with death 2 and 3 days later, of an embolic shower and shock.



Recovery in a case of pulmonary embolus by a successful Trendelenburg operation is reported by H Stegemann (Munchen med Wchnschr 75 1165 (July 6) 1928) Likewise, 2 cases are reported by A W Meyer (Deutsche Zeitschr f Chir 205 1 1927) In both cases, the emboli were successfully removed, but in one the patient died 25 days later, of a secondary embolus A case of chronic pulmonary embolism is mentioned by Ljungdahl (Deutsches Arch f klin Med 159 362 (June) 1928) A train of symptoms, unexplainable for years, was present

Seven cases of embolectomy are reported by A W Allen (New England J Med 201 304 (Aug 15) 1929). Three patients died in the hospital soon after, 3 patients had a temporary restoration of circulation, with a later amputation, and the only other patient had a permanent restoration of the circulation at the bifurcation of the femoral

A case of embolectomy of the left femoral 7 hours after onset of symptoms, with recovery, is reported by U Banı (Policlinico (sez chir) 35 117 (Mar) 1928) The patient died 17 days later of heart failure

**EMETINE POISONING.**—F G Cawston (J Trop Med 32 22 (Jan 15) 1929) warns against the prolonged administration of small doses of emetine Small doses are to be feared more than heroic doses during the first few days of treatment It should be given in large doses every other day, as it enables the system to recover from the toxic effects of one dose before the next is given *Albumin* in the urine is one of the most important danger signals of emetine poisoning The earliest signs of paralysis are seen in the increase of pulse rate from the irritative action of the drug on the nerve endings supplying the heart muscle Later, looseness of the

bowels, weakness of the legs, or definite paralysis of some nerve endings may be seen Cardiac stimulants should be used at the earliest possible moment after signs of the cumulative action of emetine become evident In **dysentery** emetine should be given both orally and intramuscularly, it is doubtful whether intravenous injections are ever required As soon as the symptoms of poisoning from emetine are recognized, the patient should be put to bed for 48 hours

**EMPYEMA.—CHRONIC —COMPLICATIONS**—Of 88 cases of empyema reported by A. O Wilensky (Arch Surg 16 288 (Jan-pt 2) 1928), approximately 25 per cent were complicated by some form of bronchopulmonary suppuration In practically all, the clinical course suggested that the empyema was secondary to the intrapulmonary lesion Several occurred during a general infection, and it is equally possible that the empyema and the pulmonary abscess were independent lesions Most of the other cases followed pneumonia In approximately 71 per cent, some form of bronchopulmonary fistula existed which communicated with the operative wound in the wall of the chest by way of the empyema cavity The pulmonary suppurations occurred in the form of pulmonary abscesses, and they were frequently multiple There was only 1 case in which an abscess existed which resembled the hard indurated form so commonly seen after tonsillectomy In this series of 88 cases of empyema, the wounds of all but 3 of the patients who recovered healed completely after primary operation, and remained healed, and with few exceptions, the post-operative convalescence was uneventful

**DIAGNOSIS**—Empyema should always be suspected, according to A L

Lockwood (Arch Surg 16 297 (Jan-pt 2) 1928), when a febrile condition is maintained longer than usual following pneumonia, typhoid fever, scarlet fever, influenza, tonsillitis, after a surgical procedure, operations on the nose and throat, and the extraction of teeth. In such cases, the chest should be carefully examined and stereoscopic x-rays made early.

**TREATMENT**—**Aspiration**, in the opinion of A. L. Lockwood (*loc cit*), should not be resorted to unless it is impossible to obtain x-rays, and then only if a definite area of fulness is found. Emergency operations are not justifiable unless the presence from the collection is so great that respiration is embarrassed or circulation is impeded, and the rapid removal of fluid is dangerous. Except in tuberculous pleurisy, in which the fluid is straw-colored, the withdrawal of clear fluid that flows freely indicates that aspiration has been performed too early. Often, even fairly thick fluid would be quickly absorbed within the pleural cavity, and the fluid is first a protective mechanism to splint the lung and stabilize the mediastinum. Death in the acute stage of the disease is due, not to the absorption itself, but to too early interference with the fluid, collapse of the remaining air-bearing tissue, and insufficient oxygenation incidental to the resulting pneumothorax. Lockwood found pneumococci in 39.4 per cent, streptococci, in 20.4 per cent, staphylococci, in 3.6 per cent, miscellaneous bacteria, in 1.6 per cent, and sterile fluid was present in 18.2 per cent. **Aspiration** was done in the early stage of the disease, with air replacement if the fluid was thick. If this did not cause improvement, **closed drainage**

was established by the catheter and cannula method. If there was still no improvement, drainage was established by incision through an interspace, and later, if necessary, a rib was resected, care being taken that the opening was at the lowest portion of the cavity. **Forced feeding** and **blood transfusion** were used as supportive measures. Radical operations in chronic empyema should only be resorted to after a thorough trial of the **Carrel-Dakin treatment**. Cavities having a capacity of more than 3 ounces, should first be treated by endeavors to expand the lung. For cavities with a capacity of less than 3 ounces, especially those peripherally situated, **closure by muscle or skin flap**, and **limited resection** of the wall, or similar simple methods should be used. After extensive operations, a **decortication** with **partial resection** of the bony wall of the chest and thickened parietal pleura may be done. For the most complete result, the incision should be hermetically sealed to establish a negative pressure and maintain the re-expanded lung in expansion. Small multiple operations contribute to sound surgical judgment.

In the **surgical treatment** of chronic empyema with collapse and fixation of the lung, Jennings (Ann Surg 86 616, 1927) emphasizes the importance of a wide flap opening in the chest wall, incision along the pleura along its outer edge, and liberation of the lung from its bed so that it may come forward. Because of the danger of tearing the lung in stripping the pleura, the pleura on the anterior surface of the lung is not touched. In a boy of 19 years, who had 2 years of inadequate drainage, the first step consisted in obtaining drainage by re-

secting portions of 3 ribs Two weeks later, the lung was stripped from its bed and allowed to roll forward About 3 months later, the chest was again opened and the false membrane stripped from the surface of the lung which was freed, and a flap of the chest wall under the scapula mobilized and allowed to drop back, while portions of the sixth, seventh, eighth, ninth, and tenth ribs were removed to collapse the cavity at the bottom A small sinus persisted and gave increasingly severe symptoms through its intermittent opening and closing At an operation for the closing of this sinus, a bronchial fistula was found, which was finally closed after rib resection and muscle implantation In the second case, decortication was done and the chest closed. Twenty months later, a sinus tract opened up The removal of a rib sequestrum found at the bottom of the sinus tract was followed by recovery

**Valvular thoracotomy for empyema** is advocated by C L Gibson (Am J Surg 6 625 (May) 1929), after the plan of Forgue, of Montpellier, France After infiltration with  $\frac{1}{2}$  per cent. **procaine solution**, a rectangular flap is raised with its center corresponding to the middle of the intercostal space to be entered, measuring about 2 by 5 inches, with the base above The flap consists only of skin and subcutaneous tissue and covers a wide incision of the intercostal tissues without rib resection A sheet of rubber dam a little wider than the flap is introduced into the thoracotomy wound and the flap of skin and subcutaneous tissue are permitted to fall over the opening The rubber dam is renewed daily or every other day.

An irrigation of **Dakin's solution** is used if the discharge becomes offensive Of 12 cases reported, 8 were typical, and there were 2 deaths

G Picot and R Grégoire (Bull et mém Soc nat de chir. 55 469 (Mar 30) 1929) resort to a method of **drainage** of the pleural cavity "with closed thorax" that prevents the penetration of the air from the outside into the pleural cavity, but Picot, following **Delbet's method**, consisting of a small rib resection and a siphon drain immersed in an antiseptic solution, observed a rapid cure in from 10 to 25 days in all but 1 of 24 cases of empyema, with fistulization in only 1 case Grégoire uses a **valvular thoracotomy**, avoiding the rib resection on account of the frequent occurrence of osteitis in the ends of the resected rib, his method being similar to that of Forgue, a flap of skin and underlying muscle being raised over the intercostal space which is incised

E H Roche (Guy's Hosp Rep 78 332 (July) 1928) thinks that in the treatment of acute empyema in adults the application of **continuous suction** of the correct tension may be expected slightly to shorten the course of the disease and lead to slightly better recovery of the lung, and that in the treatment of chronic empyema, in which healing does not occur within 6 weeks, continuous suction is of great value if properly applied

F G Thomson (Brit M J 1 89 (Jan 19) 1929) also favors **continuous suction drainage** by means of a self-retaining rubber catheter which is introduced directly through a small incision into the chest or through a cannula which is withdrawn as soon as the drainage tube has been inserted The cavity is irrigated by a

solution of chlorinated soda 2 or 3 times a day, to dissolve the fibrinous masses which may interfere with suction. Irrigation with some antiseptic solution should be carried out 2 or 3 times a day, no matter what method of drainage is adopted. After removing the catheter, a fine tube is introduced into the sinus to drain the small cavity remaining. The average period during which drainage is required was 19 days. Of 12 patients, 1 death followed the treatment.

J Jager (Zentralbl f Chir 56 2064 (Aug 17) 1929) uses closed drainage with a rubber tube introduced into an intercostal space, collecting the pus in a special container termed an "empyema aspirator." The cavity is irrigated daily with physiologic saline solution until pus is no longer produced, which usually occurs in from 10 to 20 days, when the drain is removed and the edges of the opening drawn together with adhesive tape.

D Hart's apparatus (Arch Surg 17 102 (July) 1928) produces a continuous tidal irrigation which is carried out by the normal respiratory movements. The apparatus, however, may be obstructed by thick pus or pus clots, and leakage of pus may occur along the tube. The apparatus consists of a rubber tube passed into the dependent part of the empyema cavity through a trocar wound, connected by means of a T-tube with a rubber bag on one side and a rubber tube leading through a Y-tube to an irrigation bottle above and a drainage bottle below on the other side. The rubber bag is strapped to the abdomen just below the trocar thoracotomy wound and slightly below the level of the empyema cavity when the patient is in Fowler's position. This gives a

slight amount of suction at all times. Early in the treatment, the fluid within the bag should be renewed every hour, in order to keep the pus relatively thin. Later, when the cavity has become small and thin, it is necessary to refill the bag only a few times in 24 hours. The continuous movement of the fluid prevents the coagulation of fibrin and reduces the blocking of the tube.

H Binney (New England Med 199 410 (Aug 30) 1928) believes that preliminary aspiration is often of great value for the empyema following pneumonia, and that, in accordance with the experience of many others, the closed method, as a routine procedure, combined with irrigation with surgical solution of chlorinated soda, gives a lower mortality rate than is obtained by open drainage and also a lower incidence of chronic empyema.

Iodized oil was used in 5 cases of empyema reported by J L Ransohoff and J D Heiman (Surg Gynec Obst 46 708 (May) 1928), 4 of which healed rapidly after the injection of iodized oil into the residual cavity after treatment of empyema by aspiration, drainage and Carrel-Dakin instillations seems to have a decided beneficial action.

Nine cases of *pneumococcus empyema* were treated by intrapleural injections of ethylhydrocupreine hydrochloride (optochin) by H Lowenburg (J A M A 93 106 (July 13) 1929), with recovery and without disabling or serious complications or sequelæ. Aspiration of as much pus as possible, followed by the injection of 5 to 10 cc (1¼ to 2½ drams) of a 5 per cent sterile, watery, warm solution of ethylhydrocupreine hydrochloride, was made. Some infection of the

puncture wound occurred in a few of the cases. From 3 to 10 injections were made, according to the condition, and they were repeated about every third day.

**MASSIVE — OBLITERATIVE OPERATIONS** — The object of all operations for empyema is the obliteration of cavity. This may be accomplished by securing re-expansion of the lungs by decortication, or more certainly and safely by overcoming the rigidity of the cavity walls, diminishing the arch or curve of the bony parietes and bringing the relaxed parietal and visceral surfaces of the affected pleural space into apposition. Obliteration takes place by fibrosis, beginning in the angle of reflection. C. F. Hegner (Ann Surg 87:506 (Apr) 1928) enumerates the difficulties that may interfere with the successful obliteration of the empyema cavity as follows: (1) In the chest wall abscess, cellulitis of the skin or soft parts, necrosis of the ribs, rigid or osseous ring at the site of drainage orifice and rigidity of the peculiar structure of bony chest wall and fusion of adjacent ribs, (2) in the pleura a thickened, fibrous, rigid parietal or visceral pleura, long tortuous, rigid sinuses leading to remote foci within the lungs or pleural cavities, irregular, multi-locular encysted, indefinitely drained, intra-pleural or intra-lobar empyema cavities, adhesions, which withdraw, compress or confine the lung in an abnormal position, thick pus mixed with air, blood, fibrin or sloughs, foreign bodies, (3) in the lungs a pulmonary abscess or cavity, bronchiectatic cavities or fistulae.

To prevent the pleural surfaces exposed in empyema cavity from be-

coming covered by thick, plastic exudate, which later will organize and form a compressing, fibrous membrane of fixed tethering adhesions, thoroughly controlled closed drainage must be established as soon as aspirations have become ineffective or the exudate is slightly purulent. Open drainage is to be avoided except in localized encysted empyema in children, in women and in persons with elastic thoracic walls. Diminution of the cavity and maximal re-expansion of the lungs should be favored by the early practice of resistive breathing, positive intra-pulmonary pressure or negative intrapleural pressure. Drainage may be supplemented by irrigation. Bland solutions are quite as effective as antiseptic solutions. Properly used Dakin's solution, although a surface antiseptic, is of great value as a cleanser, chiefly, if not solely, by reason of its proteolytic property which liquefies fibrin, plastic lymph and non-viable tissue. When this debris is removed, the viable tissue and body fluids may develop sufficient resistance to overcome the bacterial growth. By reason of the decorticating action of Dakin's solution, a surprising degree of re-expansion may be obtained. If there are bronchial or pulmonary fistulas, irrigation with irritating chlorinated solution is contraindicated. Occluded bronchial fistulas may be reopened by liquefaction of the occluding slough. Rarely, the mechanical or operative removal of contracting fibrous membrane by the decortication operation of Fowler and Delorme may be of advantage. When the purulent exudate cannot be controlled, and the condition of the lungs and pleura is such that re-expansion is no longer

possible, the chest wall must be contracted to meet the compressed lungs

Empyema involving the costovertebral groove cannot be obliterated by any of the usual rib operations. The removal of short segments of ribs, posterior to the angle secures a much greater degree of collapse than the removal of long segments anterior to the angle. Posterior empyema can be diminished or obliterated only by the removal of the posterior rib segment. The indirect approach, through a straighter slightly curved paravertebral incision exposes the angles of the ribs, gives easy access to the removal of the segments posterior, as well as greater desired length anterior to the angle.

The deribbing must extend well beyond the limits of the cavity. The closed operations have the Estlander procedure as a prototype. Subperiosteal rib segments are removed from the lateral aspects of the chest, often, however, with inadequate collapse. Open operations, are based upon Boekel's procedure. After removing long segments of ribs, he found the parietal pleura so rigid that he made a cross incision through the pleura and fashioned flaps which he introduced and held in place by large sponges. He was the first to suggest the use of flaps to secure obliteration. Indirect attack is used by Schede and others, who unroof the cavity, and the large fenester is covered as completely as possible by replacement of flaps of skin and superficial muscle. This unroofing of the cavity, especially if it is deep or extensive, entails the useless sacrifice of tissue and is undesirable in its immediate and remote effects. The bone does not

regenerate and the area remains unprotected. Respirations may be embarrassed and underlying viscera endangered. Souberet, finding that encysted empyemas are more common posteriorly, effected mobilization by the removal of segments of ribs posterior to the angle and as close to the spine as possible. Then ribs are resected from the middle or lateral aspect of the chest wall, their outward swing is opposed from within only by whatever adhesions may be present. Tension of adhesions from the ribs pulls the lungs further from the costovertebral groove where adhesions are less extensive and the purulent matter perhaps greater. This increases rather than diminishes the capacity of the groove.

When a rib is resected in its middle area, the normal elasticity is expended on the unopposed anterior posterior stump which assumes a more horizontal position. These rigid buttresses interfere rather than facilitate approximation of the chest wall with a retracted lung. Boiffin, in 1894, performed the first paravertebral thoracoplasty for the prolapse of an empyema cavity. No one except Wagner, had attempted the approach from behind. The Boiffin type of operation has been popularized for the collapse of the chest wall, for unilateral pulmonary tuberculosis. A long greater curved para-vertebral incision is made about  $2\frac{1}{2}$  inches from, and parallel with, the spinous processes. Spinal muscles are retracted backward and scapulæ retracted upward and forward, and subperiosteal resection of the necessary number and length of ribs is made flush with the transverse processes of the corresponding vertebræ of each rib.

The most acute arc of the rib is removed and the cavity is not opened. Provision for necessary drainage is made at the most dependent angle, thus greater and more uniform collapse can be obtained by resecting short segments of ribs posterior to the angle than can be secured by resecting longer segments anterior to the angle. Ribs regenerate in tile-like obliquity and furnish support and protection, and the prolonged dressings of granulating surfaces incident to unroofing operations are seldom necessary. The incision can be so placed that it will not involve the region of the necessary drainage tube and infection of the wound is less probable and more easily controlled.

Empyemas of considerable size and those extending posteriorly and in the costovertebral groove, and especially those complicated by pulmonary fistulas, indirect or posterior approach by **paravertebral thoracoplasty** is the operation of choice.

The following principles of the treatment of empyema are given by L. S. T. Burrell (Lancet 1 1265 (June 15) 1929): 1. Remove the pus but always avoid an open pneumothorax.

2. Encourage the lungs to re-expand and obliterate the empyema cavity. In order to do this, the cavity should be irrigated with **Dakin's solution** and the drainage of a large cavity should be arranged as far as possible so that air cannot enter the outside.

3. Sterilize the cavity by frequent irrigations with **Dakin's solution**.

4. Attend to the general condition and nourishment of the patient.

In *pneumococcal* empyema, adhesions often produce a localized cavity, and open drainage may give excellent results. In *streptococcal* empyema, early operation and open drainage often means disaster. In *tuberculous* empyema, the pus should be removed by aspirations and not by open drainage and lungs should be encouraged to expand in order to obliterate the pneumothorax or empyema cavity, and should the lungs fail to re-expand, some thoracoplastic operation including **phrenic evulsion** or **thoracoplasty** should be performed to obliterate the cavity.

**TUBERCULOUS** —The prognosis of tuberculous empyema is always grave, and the post-operative mortality is high.

From the standpoint of treatment, the cases fall into 3 groups, according to R. Janes (Canad M A J 18 10 (Jan) 1928): (1) Those of empyema in a closed cavity without secondary infection, (2) those of empyema in a closed cavity with secondary infection, and (3) those complicated by a bronchial fistula, a chest-wall sinus, or both. Sterile purulent exudates in a closed cavity should be treated as a pleural effusion if the lung expands when the fluid is withdrawn. When the lung is fixed in collapse, **thoracoplasty** should be performed. Continued aspirations may lead to secondary infections. Open drainage should never be established in sterile cases. If a bronchial fistula or empyema necessitatis develops, thoracoplasty should be done at once, before the occurrence of secondary infection. When secondary infection is already present, the problem is exceedingly difficult. Efficient drainage should be established, preferably by the closed method and irri-

gation of the cavity undertaken Dakin's solution is contraindicated as too irritating. Later, a multiple-stage complete thoracoplasty should be performed to convert the large cavity into a small shallow one with a scanty discharge. In favorable cases, the shallow cavity may be later unroofed, packed with iodoform gauze, and treated with quartz light, and the resulting defect closed with a pedicled skin graft.

Eleven cases of tuberculous empyema are reported by G T Hebert and W E Chiesman (Tubercle 9 257 (Mar) 1928) to prove that tuberculous empyema can be treated satisfactorily by repeated replacement with air. The healing of the pleura is promoted by contact with air instead of with fluid. The average number of replacements is 10, extending over a period of about a year. Patients may be well enough to return to work in about 3 months from the beginning of the treatment.

E Sergent and R Turpin (Bull et mém Soc méd d hôp de Paris, 52 984 (June 14) 1928) report 2 cases of purulent tuberculous empyema treated by repeated aspirations and the injection of gomenol. In the first, the lung had expanded at the end of 10 months and was adherent to the chest wall. In the second patient, at the end of 6 months, the lung had partially re-expanded and was adherent. De Masary reported an arrest of the tuberculous process after aspirations and the injection of electrargol, without re-expansion of the lung, however.

**EMPYEMA IN CHILDREN.**—Empyema in childhood is usually a secondary process. In 92 per cent of 371 cases of empyema studied by C

E Farr and M I Levine (Surg Gynec Obst 46 79 (Jan) 1928) it was an aftermath of pneumonia. The mortality during the first year was 66 per cent, during the second year, 33 per cent, and after the second year the mortality rate steadily declines until about the sixth year. After that, the deaths are seldom and usually result from a severe complication. The total mortality for this series of 371 cases was 19 per cent. During the first 6 years, the mortality was 22 per cent, and from the sixth to the fourteenth year, 10 per cent. The mortality in almost all instances is due to a general condition of debility brought on by the previous illness, or to existing complications rather than the empyema itself.

**TREATMENT**—The method of treatment used, according to Farr and Levine (*ibid*)—whether it is the intercostal incision, rib resection, open drainage, closed drainage, the use of Dakin's solution, or simple drainage—seems to have little influence on the prognosis. In choosing the time for the operation, however, the surgeon should be guided by the character of the pus and the patient's condition. Recurrences seldom result if free drainage is obtained and maintained.

**Autogenous vaccines** administered principally by intravenous injection, were used in 41 cases of empyema in infancy by C Catteruccia (Pediatrics 37 375 (Apr 1) 1929). There were 7 deaths, 4 of these patients being under 10 months of age. In the milder cases, puncture alone may be sufficient, in the more severe cases, the injections were given on alternate days, and if a pleurotomy became necessary it was performed in the eighth or ninth intercostal space, as



far back as possible. In very septic cases the pleural cavity was washed out with physiological saline solution. Fraenckel's diplococcus was present in 37 and a streptococcus in 2 cases, associated in 1 case with staphylococcus.

Ultraviolet irradiation in children pleurotomized for empyema was used in 2 cases of purulent pleurisy by J Bosch Marin (*Arch españ de pediat* 12 665 (Oct) 1928). The suppuration ceased and the drains were withdrawn after 15 and 21 days respectively.

[It is, of course, to be observed that prompt recovery often occurs after very simple methods of treatment in the empyemas of childhood—Ed.]

Gralka's method of irrigating the pleural cavity with ethylhydrocupreine hydrochloride (optochin) is considered the method of choice by L Silber (*Monatschr f Kinderh* 39 35 (June) 1928). For very young infants, however, the irrigations are too severe, and frequent puncture, combined with the intramuscular injections of blood, is preferable. By the use of these methods, the mortality was lowered from 79 per cent for cases treated up to 1922, to 67 per cent for those treated since 1923.

H Pogorschelsky (*Ztschr f Tuberk* 50 460 (May) 1928) also advocates puncture followed by repeated irrigation with ethylhydrocupreine hydrochloride or drainage, according to the existing condition.

R Grosser (*Monatschr f Kinderh* 43 222, 1929) who considers ethylhydrocupreine hydrochloride (optochin) according to Gralka's method as the safest, most reliable treatment of pneumococcus empyema in infants and children, believes the method contraindicated in all forms of chronic

empyema and in empyema necessitatis. It is also ineffective in cases in which the empyema is only one manifestation of a general condition, as in toxic pneumonia.

In S Ederer's opinion (*Klin. Wchnschr* 7 1906 (Sept 30) 1928), open treatment is indicated only as a last resort. The mediastinum is much more delicate in children than it is in adults, and the mortality from thoracotomy and rib resection is 75 per cent in infancy and 30 per cent in early childhood. Puncture alone is not, however, sufficient. (1) Because it does not completely empty the pleural space, (2) because early adhesion and the formation of isolated pus pockets are not prevented. A vicious circle is set up by the acidity of the pus, which acts as an irritant and increases the inflammation. Ederer combats this by irrigation with an alkaline phosphate buffer solution, consisting of an isotonic solution of a mixture of sodium acid phosphate and sodium phosphate. The pH of the buffer was between 7.5 and 8, according to the pH of the pus and should not exceed these limits. The volume of the solution used in the refilling must not be more than half that of the pus removed. In the subacute stage, the refilling is usually unnecessary, and the irrigations should be made, not daily, but once in from 2 to 5 days, till the puncture no longer yields an exudate.

A Plate (*Deutsche med Wchnschr* 55 528 (Mar 29) 1929) treated 6 children with empyema, 2 of which were under 1 year of age, by intercostal incision with subsequent drainage and suction by means of an air pump. The incision was made under local anesthesia and a rubber drain in-

serted, and for 24 hours the pus was allowed to discharge. The day after the operation, the pump was employed, the suction being continued until sanguineous fluid appeared. This procedure was repeated every 3 or 4 days. After 4 weeks, the drain could usually be removed, and the x-rays were often helpful in determining the right time for removal of the drain. Recovery in all cases occurred in from 4 to 6 weeks.

From an analysis of 80 cases of empyema occurring in infants under 2 years of age, treated at the Johns Hopkins Hospital, W. F. Rienhoff, Jr. and W. C. Davison (Arch Surg 17: 676 (Oct) 1928) found that because of the small chest area, it is difficult to distinguish the relatively small area of dulness by percussion. Of 48 infants who were operated upon either by rib resection or the insertion of a trocar cannula, 19, or 39.6 per cent, died. Of 9, upon whom only 1 or more thoracenteses were performed, 1 recovered and 6 died within 48 hours after the diagnosis of empyema was made and before an operation could be performed. The mortality was highest among infants suffering from left-sided or double empyema. About two-thirds of the cases of empyema were caused by pneumococci, but in this group the mortality was one-half that of the group in which the infection was due to other organisms. In the cases with complications, the mortality was 4 times as high as in cases without complications, and the mortality was lower (29.2 per cent) in the cases in which the open method—rib resection—was used than in those operated upon by the closed method, where the mortality was 50 per cent. **Open thora-**

**cotomy** by rib resection is advocated, as 92 per cent of the infants with pneumococcal empyema recovered following open drainage, whereas only 50 per cent survived following closed drainage. In the entire series in which open thoracotomy was done in both streptococcal and pneumococcal type, the mortality rate was 27 per cent. A partial pneumothorax resulting from the open thoracotomy is apparently less dangerous than is the inadequate drainage associated with the closed thoracotomy.

While Holt prefers the closed method of treatment, from a series of 266 cases, Ladd and Cutler conclude that, except in streptococcus infections, **rib resection** gives more satisfactory immediate and remote results. D. W. Paiker (Boston M and S J 197: 653 (Oct 20) 1927) used **closed tube drainage** in 18 cases with 1 death. A preliminary aspiration to determine the character of the exudate is first made, usually in the posterior axillary line between the seventh and eighth rib. If frank pus is found, **thoracotomy** is performed at once, but if it is serofibinous or thin and only slightly turbid, **aspiration** alone is done to relieve pressure symptoms and thoracotomy is deferred until the character of the exudate changes. Under **novocain-infiltration anesthesia**, an incision 1 to 1½ inches in length was made in the posterior axillary line between the seventh and eighth ribs. The intercostal muscle was perforated by forceps or scissors and a 24 to 27 F catheter introduced through the opening with a perforated piece of rubber dam, 3 inches square, which was plastered to the chest wall with adhesive tape. After careful aspiration, the catheter was connected,

by rubber tubing, to a jar of water on the floor, the clamp not being removed from the catheter until after the tubing had been placed in the water. After 24 hours, the chest was irrigated through the catheter every 2 hours with from 30 to 60 c c (1 to 2 ounces) of a 1 per cent chlorazinc solution. This procedure was continued through convalescence, the solvent action of the Dakin's solution being a valuable feature of the treatment. The tube should be left in the chest for from 15 to 20 days.

In contrast, E. T. McEnery and J. Brennemann (J. A. M. A. 93:362 (Aug. 3) 1929) treated 33 cases of empyema by aspiration alone, with a mortality of 9 per cent. One hundred and twenty-two aspirations were done either with a large Luer syringe or a modified Potain aspirator under local anesthesia. The aspiration was performed from 1 to 11 times, or an average of 4 times for each patient. The frequency of the operation depended entirely upon the general condition of the child and the evident amount of pus, the location of the heart and the temperature curve. Twenty-eight patients had pneumococcus, 3, hemolytic streptococcus and 1, staphylococcus albus infection. The average stay in the hospital was about 3½ months. As a rule, the temperature dropped to nearly normal following aspiration, with a gradual return to 101°, 102° or even 103° F (38.3°, 38.9° or 39.4° C) within a week or two. In 3 instances, in 122 aspirations there was a transient cellulitis about the puncture, which yielded promptly to wet dressing. Too early or too frequent aspirations are deprecated. In a series of 200 cases, Wilensky found a lessening of mor-

talidity with each week that operation was deferred up to the seventh or eighth week from the beginning of the disease, after which the mortality showed a rapid rise. It is felt that the result cannot be duplicated in older children, it is especially to be used in children under 3 years of age and uniformly in those under 1 year of age. After the age of 5 or 6, an open operation should be used after a reasonable trial of aspiration, and after the age of 10 or 12, operation is usually indicated.

### ENCEPHALITIS, EPIDEMIC.

—This disease has aroused tremendous comment since its original description, and contributions concerning it are numerous. The etiology has recently been discussed by Neal (J. A. M. A. (July 28) 1928), who, after testing the various theories of the cause of epidemic encephalitis, concluded that the etiologic agent has not yet been proved. Zinsser (Arch. Path.) has reviewed the recent ideas of the etiology and throws doubt on the streptococcal and ultra-virus causation of the disease. So far we cannot say what causes epidemic encephalitis.

*Ocular Symptoms*—Of the numerous symptoms which the disease may manifest the ocular symptoms are extremely important. These are of various sorts. Wimmer (Copenhagen, 1927) reports 150 cases from the literature and 32 personal cases with affections of the optic nerves. Choked disc occurs, but not very commonly, and in these cases encephalitis is of course confused with brain tumor. It usually appears suddenly, disappears spontaneously and is caused usually by increased intracranial pressure.

Optic neuritis of varying degrees is often found. Sands reports a case of choked disc in encephalitis. Vandegrift (Med J and Record, (Dec) 1927) reports on the ocular manifestations of epidemic encephalitis and finds that paralysis of convergence is a very common prodromal symptom. Paralysis of the external rectus or of divergence may be present. Ptosis comes later than these ocular palsies. Optic neuritis is rare in his estimation and choked disc develops only as the result of increased intracranial pressure. Associated with the ocular palsies involvement of the seventh, ninth or tenth nerves may occur. In 35 per cent of cases there was defective pupillary light reaction with irregularity and inequality. Argyl-Robertson pupil may be present. The ocular symptoms may persist or disappear as the acute signs subside. In the chronic encephalitic, Blum (Thèse de Paris, 1928), has found disturbances of convergence in 54 per cent of 70 cases. Isolated oculomotor paralysis, however, which is common in the acute stage is rare in the chronic condition. The Argyl-Robertson pupil is rare, but concurrent involvement of reaction to light and accommodation is common. Barlow (Arch ophth 1 501, 1929) confirms these findings, and points out the frequent occurrence of ophthalmoplegia, both peripheral and nuclear, in encephalitis. Vertical nystagmus is said to be an important sign at times in late encephalitis. While the Argyl-Robertson pupil has often been seen in acute encephalitis, it is not common in the chronic type.

Forced movements of the eyeballs in chronic encephalitis has frequently

been reported. Recent reports have been made by Taylor and McDonald (Arch Neu and Psych 19 95, 1928), McCowan and Cook (Brain, 51 283, 1928), Jelliffe (1929), Stern (Berlin, 1927), Pardee (Am J M Sc (May) 1928) and Alpers and Patten (Arch Neu and Psych, 1927). All these cases are associated with Parkinsonism. The eyes may be fixed in any position, but the commonest deviation is upward. Pain sometimes accompanies these attacks. The mechanism is not well understood. Sometimes palpebral spasm accompanies the spasm of the eyeballs. Pardee (Am J M Sc (May) 1928) looks on the oculogyric crises as a hyperkinetic phenomenon.

*Abdominal Reflexes* — Pakodzky (Deut Zeitschrift fur Nerven 103 309 (May) 1928) found the abdominal reflexes weak or absent in 10 of 15 cases of acute encephalitis. In 56 chronic cases they were normal in 36, exaggerated in 10, and sluggish in 5. Partial or complete absence was present in only 6 cases.

*Encephalitis in pregnancy* has been reported in several instances. Alpers and Palmer (Jour Nervous and Mental Dis (Oct) 1929) collected 37 cases from the literature and added 2 cases of their own. Of the 37 cases there were 21 deaths. Where delivery occurred it was often painless. The course of the disease is the same in cases of pregnancy as otherwise. In one of the author's cases encephalitis was followed by complete recovery, with the recurrence of encephalitis in the latter months of pregnancy, spontaneous delivery, and the appearance of parkinsonism. In the second case reported there was an encephalitis which appeared in the

third month of pregnancy with complete recovery. The encephalitis recurred in a succeeding pregnancy and was followed by a parkinsonism syndrome. Roques (Proc Roy. Soc Med London 21 1053, 1928) has reported at some length on a similar condition. He found that labor and the puerperium do not affect the condition adversely. Women in whom the encephalitis is mild go on to term and deliver normally. Occasionally the fetus dies in the uterus. The parkinsonian state developed in 80 per cent of Roques's cases. It follows the acute phase closely, but may be delayed for months or years. In some instances it did not develop until a subsequent pregnancy. The child is not adversely affected by the encephalitis. In 27 of 33 cases a healthy infant was delivered at term. As a rule the post-natal condition of the child is good, but epidemic encephalitis neonatorum has been established as a definite clinical entity. There is evidence that occasionally the virus can make its way across the placental barrier. The treatment depends on the individual case. When parkinsonian symptoms develop during pregnancy the induction of labor is indicated. In cases of pregnancy complicated by acute encephalitis the induction of abortion or premature labor is not indicated.

*Mental Disturbances* — Kirby and Davis (Arch Neu and Psych 5 491, 1921) made an excellent study of these several years ago. Hall (Brit Med Journal 1 444 (Mar 9) 1929) studied 113 cases and found 92 with mental symptoms in either the acute or chronic stage. Children and young people showed a greater tendency (89.4 per cent) than adults

(66.6 per cent). The former tended to develop a more permanent form of mental disease. Many developed manic depressive and schizophrenic-like reactions. Strecker (Arch Neu. and Psych (Jan) 1929) studied behavior disorders in children. He found that these were more apt to occur in children whose encephalitis was accompanied by delirium than in the absence of this symptom. The behavior disorders are more severe in boys than in girls, but the more studied type of misconduct is in the latter. If the onset of encephalitis is between 6 and 13 there appears to be a greater likelihood of behavior disorders.

The persistence of neurologic signs occurred in quite a number of instances. Behavior was only slightly involved in cases of parkinsonism. Fribourg-Blanc (Paris méd, 1928) conclude that the mental troubles of the chronic state of encephalitis are manifested by disturbances in mood and character and by perversion of the moral sense. They are characterized by instability, irritability, impulsiveness, and inadaptability. Sands (Am J Psych (May) 1928) describes cases of encephalitis that are ushered in by mental disturbances, the latter being the first evidence of the disease. Only later, when neurological signs develop is the true nature of the disease recognized. The cases show either delirium or impulsive conduct. Wimmer (Acta psych et neurol, vol 3, 1928) classifies the psychotic syndromes following encephalitis as follows: (1) Psychasthenic states, (2) depressive states, (3) character changes, (4) confusional states. Schilder states that the psychoses of encephalitis differ from

schizophrenia and are either an acute delirium or an acute confusion

*Other Sequelæ*—Tinel, Schiff and Courtois (Paris méd (Sept 1) 1928) report a case of parkinsonism with marked atrophy of all the extremities

Wimmer (Acta psychiat et neurol, vol 111, 1928) reports major epileptic convulsions in encephalitis, and Stern ("Die Epidemische Encephalitis," Berlin, 1928) confirms this finding though he found it in only 8 of 450 cases. Wimmer (Acta psychiat et neurol vol 3, 1928) found 30 cases with epilepsy which fall into two groups: those with epilepsy and other signs of encephalitis, and those with very few other signs save the epileptic attack. Claude (Encéphale 23 522 (June) 1928) reports epileptic attacks with hyperthermia in encephalitis

Amyotrophic lateral sclerosis as an encephalitic sequel has been reported by Wimmer and Neel (Acta psychiat et neurol vol 3, 1928) in 20 cases but most of the patients did not have parkinsonism. Atrophy was bilateral, but in a few cases it was unilateral, in others bulbar symptoms, and in 2 cases there were features of myasthenia gravis. In 2 cases examined post-mortem the typical lesions of amyotrophic lateral sclerosis were found

Friedreich's ataxia has been reported as coming on after encephalitis in a girl and two brothers by Mussio-Fournier and Agorio (Rev neurol (Mar) 1928)

**PATHOLOGY**—Seifried and Spatz (Zeit für die Gesamte neurol und psych, 1930) have made a very fine contribution to the study of epidemic encephalitis. They group this disease with the Borna disease, poliomyelitis and

lyssa and show that these diseases have a definite predilection for certain regions of the brain. In the mid-brain the areas implicated are the substantia nigra, the aqueductal gray matter, and the colliculi. In the diencephalon it is the gray matter of the hypothalamus and parts of the thalamus. In the cortex it is chiefly the temporal lobe. They show that those areas in contact with the spinal subarachnoid spaces and cisterns are most affected and that the disease is therefore spinal fluid borne, and not blood borne

Lhermitte (Paris méd (Feb 11) 1928) was unable to find any pathology in the sebaceous glands of the face in patients with the oily skin of encephalitis. Changes in the cortex have been reported by Bertrand and Chorobski (Rev Neurol (Aug) 1929)

**TREATMENT.**—Any number of remedies have been tried in the treatment of encephalitis. **Harmine**, a derivative of *Perganum harmala*, has been advocated by Leroin and Hill and Worster-Drought (Lancet 2 647 (Sept 28) 1929), in doses up to 0.04 Gm ( $\frac{2}{3}$  grain), hypodermically. Alford (South Med Jour 21 649 (Aug) 1928) advocates the use of **dextrose** in cases of parkinsonism and other states where actual destruction of tissue has occurred. He used a 10 per cent solution intravenously in amounts from 150 to 500 cc (5 ounces to 1 pint). The injections were given daily for 15 days. **Sodium salicylate** intravenously in acute cases of encephalitis has been advocated by Carnot. Nuvoli (Il Policlinico (sez med) (Apr) 1929) has treated 18 cases of acute encephalitis with **x-rays**. The best results were obtained in

cases treated during the first 15 days of the disease. Strong doses were used—a spark equivalent to 40 cm and an intensity of 2 milliamperes filtered through 0.5 mm of zinc, 4 mm of aluminum, and a focal distance of 23 cm. Malaria treatment of encephalitis has been advocated by Craig (Lancet (Oct 22) 1927), with good results. The use of stramonium in doses of 20 to 70 minims (1.25 to 4.25 c c) 3 times daily has been urged by many with good results.

### ENCEPHALITIS, POST-VACCINAL. See SMALLPOX

### ENCEPHALOGRAPHY. —

The method of air injection into the lumbar sac and the replacement of spinal fluid has made possible clear visualization of the brain surfaces by means of the x-rays. E. D. Friedman, W. Snow and J. Kasanin (Arch Neurol and Psychiat 19:762 (May) 1928) reported 47 cases in which 16 types of organic brain disease were disclosed. Although they advise against its use in posterior fossa tumors, 2 cases showed no untoward reactions to the procedure. The information gained in *cerebral tumors* is superior to the ventriculogram, and its use in *epilepsy* often discloses gross lesions otherwise undetectable.

H. K. Pancoast and Temple Fay (Am J Roentgenol 21:421 (May) 1929) take up in detail the indications, contraindications and the technic of the procedure, as follows:

**TECHNIC**—The patient is placed upon a litter preferably and lumbar puncture done in the prone position by introducing an unbreakable needle (gold or nickeloid steel) between the fourth and fifth lumbar spinous processes and interspaces. When clear, colorless fluid is encountered, the pressure reading is made to determine the exact pressure at the beginning of the procedure. The second needle is then introduced at one interspace higher, between the third and fourth processes. When clear colorless fluid has been encountered in this second needle, the manometer is at once

disconnected, the stylets of the needles replaced, and the patient carefully raised to the upright sitting position, care being taken to maintain the relative curvature of the back in relation to the needles, so that no change will occur in the location of the points of the needles within the spinal canal. When the patient is in the sitting position, and the head in the midline, the mercury manometer is connected to the upper needle and remains connected to this needle throughout the procedure.

The normal pressure in the sitting position for adults is approximately 20 mm Hg, a change from the prone position, where the normal is 6 or 8 mm.

If in the prone position, the pressure reading was 18 mm Hg, after placing the patient in a sitting position the pressure may be recorded about 30 mm Hg. This is a fairly constant ratio but in order to avoid the additional pressure in assuming the sitting position, if upon the introduction of the first needle the pressure has been found to be above normal, the spinal fluid is then withdrawn until the pressure registered is 8 mm Hg, and then the patient is placed in the sitting position, the pressure should register around 20 mm Hg, the normal. The stylet of the lower needle is then removed and spinal fluid permitted to drain freely into a small graduated container, so that the exact amount of spinal fluid obtained during encephalography may be measured. The pressure is allowed to drop from the neighborhood of 20 mm to approximately 8 or 10 mm Hg, and when this point is registered on the manometer, air is introduced by means of a sterile 20 c c syringe. It has not been found necessary to take any other precaution in the selection of air within the room itself, other than drawing back the piston of the syringe, with a piece of sterile gauze held over the nozzle. The syringe with the 20 c c of air is then connected directly with the lower needle and the air gradually introduced, watching the spinal manometer change, so that as the pressure rises, air is introduced up to a point where the pressure again reaches 20 mm Hg, irrespective of the amount of air introduced, in proportion to the fluid withdrawn, as at no time should there be permitted a pressure of more than 20 mm to exist as registered by the spinal

manometer connected with the upper needle. When 20 mm Hg has been reached, the syringe is withdrawn from the lower needle, and spinal fluid again permitted to drain until the pressure has fallen to 10 mm or below, and again air is introduced sufficient to increase pressure to 20 mm Hg. *Fluid should never be sucked out by the syringe*

During this procedure the assistant or nurse gradually rotates the head, flexing it forward onto the chest and backward, as far as possible, with intermittent rotations in a circle from side to side, as close to the shoulder as can be permitted without moving the spinal axis of the patient. It is important that the head come to rest in the midline after each manipulation, and when 80 to 100 c c of fluid has been withdrawn, it will be perhaps noted that fluid runs slowly, and that during periods when the chin is flexed on the chest, a free drainage of fluid may result. This process is necessary in order to empty the ventricles.

A satisfactory injection of air in the adult should require the withdrawal of at least 90 to 120 c c of fluid, and the introduction of from 80 to 100 c c of air. When possible, 100 c c or more should be the amount decided upon, otherwise the x-ray study will be unsatisfactory from the standpoint of interpretation. It will be noted that the final pressure produced after the withdrawal of 120 c c of fluid, and the introduction of 108 c c of air, is 20 mm Hg, the top normal limit for final pressure.

For example, the manometer reading will register 20 mm Hg pressure, although 10 or 12 more c c of fluid has been withdrawn than air introduced. This discrepancy between fluid and air in all probability is due to the fact that there is a compensatory amount of expansion of the air when taken from a room in which the temperature is about 80° F (26.7° C), and placed in the spinal canal where the temperature is approximately 98° F (36.7° C). This "pressure for pressure" method has proved to be safer because, in attempting to introduce equal quantities of air for the fluid removed, acute intracranial pressure may result, and the symptoms have been those of syncope, slow pulse and some respiratory difficulty. As long as the pressure readings do not permit a rise of over 20 mm the amount of

air introduced is sufficient to compensate for the amount of fluid withdrawn, and leaves the patient in a normal equilibrium, regardless of the differences in volume between air and fluid.

It has been the custom of the authors, at the end of an air injection, to permit further drainage of fluid or escape of air, so that the final pressure is around 10 mm Hg, thus compensating for the spinal fluid elaboration which may occur during the next half hour, before the opportunity has been afforded the patient to absorb some of the air present. This addition of spinal fluid in a closed space, already filled with air, though the pressure was 20 mm and normal at the time the procedure was terminated, may accumulate sufficiently to compress the air, and produce intracranial pressure before compensation can occur. The best results were obtained in those cases, where, after finally reaching a point of equalized pressure, when in the judgment of the operator, sufficient air has been introduced, that just prior to withdrawing the needles, the pressure is allowed to fall to 10 mm in the sitting position.

The 2 spinal needles are then withdrawn after the final spinal pressure reading, and the patient placed in a wheel chair, still in the sitting position, with the head maintained in the midline. The patient is taken to the x-ray department where films are secured in the sitting position. It is important that the upright position be maintained throughout the entire procedure, so as to give equal distribution of air to both hemispheres and the ventricle. If the patient is permitted to recline and lie on one side, there will be a distortion effect, due to the accumulation of air at the highest point, with the readjustment of fluid and the filling of the fluid spaces at the most dependent point, and this may lead to errors in technic and interpretation, which will make the procedure of little value.

In the experience of the authors the following **UNTOWARD SYMPTOMS** are usually noted in the patients. At the introduction of about 40 c c of air, they complain of severe frontal *headache*. This is an indication of air having reached the sub-arachnoid channels over the frontal lobe. It is the usual manifestation and may indicate that a satisfactory injection will be



obtained. Following this period, if the pressure has been carefully regulated, not to exceed 20 mm Hg at any time, the patient will show *profuse sweating*. This is at first noted over the forehead and becomes generalized, and the patient may complain bitterly of headache and some faintness, but there have been no untoward symptoms following these manifestations, if pressure has not been pushed above 20 mm Hg. The rotation of the head will at times precede *vomiting* after the ventricles have been drained, and this should be anticipated. The period of vomiting may occur during the injection or following it, and frequently is absent if the introduction of air has been gradual, and the movements of the head regulated to slow manipulation. Rapid changes of the position of the head are frequently associated with an attack of projectile vomiting, and it is therefore important, after the rotation procedure, and during the transfer of the patient to the x-ray department, that the head be held by some assistant in the upright position, as the patients usually desire to lie down or relax, so that the head falls backward. Slowing of the pulse may be encountered, and 60 beats per minute is not an uncommon result of this air injection.

The *headache* is intense, and this factor must be carefully explained to the patient before undertaking the procedure. It should not, however, deter one from undertaking a procedure which has proved to be of such diagnostic value. Rarely has it been found necessary, because of low pulse or respiratory disturbance, to remove the air after the x-ray films have been taken. This is a simple procedure if required, and is undertaken when the patient is returned to bed, a needle is introduced with the patient in the prone position, and if intracranial pressure is present, spinal fluid, or bubbles of air will emerge from the needle until the pressure has been equalized. Some operators prefer to insert the needle and place the patient in the knee-chest position, so that air rising in the spinal canal is discharged to a large extent through the spinal needle, but this means of relief has been found necessary in only 3 cases in this series.

In order to control the *headache*, which is the only disturbing element, *chloral hy-*

*drate*, 15 gr (1 gram), has been given to the adult patient about 1 hour before undertaking encephalography, and may be repeated in 4 hours if necessary. The patient should be given *codeine*, if indicated. The headache usually persists in a severe form for 6 to 8 hours, when following this, it gradually abates, and may be present to some slight degree during the ensuing 24 to 36 hours.

Many cases have been out of bed the following day, with very little disturbance.

Although the severity of the *headache* and *sweating*, some *weakness of the pulse* and *vomiting* may appear to be alarming to the operator who first undertakes this procedure, if the intracranial pressure readings have been carefully observed, there need be no concern, as these symptoms pass off rapidly, and are usually associated to some degree with any change in intracranial pressure, or the introduction of air into the subarachnoid spaces.

### ENCEPHALO-MYELITIS—

Within the past few years the subject of encephalo-myelitis has assumed increasing importance as the result of an increase in cases following *vaccinia* and the infectious diseases.

**CLINICAL TYPES** — *Vaccinal Encephalitis* — Encephalitis following the administration of cow-pox vaccine has occurred with startling frequency in the past 4 or 5 years in Europe. Studies have been made by Bouman (L Bouman and S T Bok *Ztschr f d ges Neurol u Psychiat* 111 495, 1927), J R Perdrau (*J Path and Bact* 31 17 (Jan) 1928), E de Vries (*China M J* 42 353 (May) 1928), A Eckstein (*Klin Wchnschr* 8 1153 (June 18) 1929), E Gildemeister (*Centralbl f Bakteriologie* 110 120 (Jan 24) 1929), Hurst (C D Coyle and E W Hurst *Lancet* 2 1246 (Dec 14) 1929) and others. These cases usually occur in children, but are found also in adults. There is usually an incubation period of 7 to 10 days from the time of vaccina-

tion to the appearance of symptoms. In Holland the mortality was 30 per cent and in England as high as 70 per cent. There is fever, drowsiness, coma, often convulsions and sometimes ocular phenomena as seen in epidemic encephalitis. Sequelæ do not, as a rule, occur. The histopathology is characterized by *perivascular infiltrations of inflammatory and glial cells, and by areas of demyelination around the vessels*. The pathology is very similar to that seen in acute multiple sclerosis and in disseminated encephalitis. Despite the great prominence given to the condition it is still very rare considering the number of individuals vaccinated every year. In some cases vaccine virus has been obtained from the spinal fluid of vaccine encephalitis. It is an unsettled question whether the encephalitis is due to the vaccine virus or whether a latent encephalitis is aroused by the vaccination.

*Post-infectious Encephalitis and Encephalo-myelitis* — This complication following measles, seems to have become more common in the past few years. Studies have been made by J. B. Neal and E. Applebaum (J. A. M. A. 88: 1552 (May 14) 1927), F. Wohlwill (Ztschr. f. d. ges. Neurol. u. Psychiat. 112: 20, 1928), F. R. Ford (Bull. Johns Hopkins Hosp. 43: 140 (Sept.) 1928), H. G. Creutzfeldt, J. G. Greenfield (Brain 52: 171 (July) 1929) and H. Lowenburg and A. L. Shaller (Arch. Pediat. 43: 73 (Feb.) 1926). In 12 cases of J. B. Neal and E. Applebaum (*loc. cit.*), the onset was a few days following the measles, with fever, headache, convulsions, sometimes paralysis, and with slight lymphocytosis, and slight protein increase in the spinal fluid. Lowenburg

and Shaller (*loc. cit.*) report a case with coma, tremor, hyperkinesis and with Kernig, Brudzinski and Babinski signs, and with turbid, purulent spinal fluid. This case recovered after the administration of 20 to 25 c.c. of convalescent serum intraspinally for 5 days. F. Wohlwill (*loc. cit.*) has made a careful study of the histopathology on the basis of 2 cases. He found a *glial proliferation in the subependymal region and around the veins*. In the spinal cord a very striking feature is the *marginal degeneration*. There is also *myelin destruction with collection of waste products in phagocytes*. The *vessels are congested and small hemorrhages may occur*. F. R. Ford (*loc. cit.*) found that measles is complicated by encephalitis in 0.4 per cent of cases. The onset is on the fourth to the sixth day after the fever has fallen and the rash has begun to fade. The symptoms are initiated by drowsiness and convulsions followed by stupor, muscular rigidity, twitchings and a sharp rise in temperature. Recovery may occur from this stupor or it may continue with severe venous complications resulting. The spinal fluid shows a moderate increase in lymphocytes and protein, and a rise in pressure.

Encephalo-myelitis has been reported by French observers following chicken-pox. The onset was with backache and muscular pains, and followed by paralysis, sphincter disturbances, some difficulty in speech and swallowing. Recovery occurred in the cases reported.

A. Querido (Nederl.-Tijdschr. v. Geneesk. 1: 181 (Jan. 14) 1928) reports a case of parenchymatous inflammation of the nervous system.

following diphtheria This is the rarest of the nerve complications of diphtheria The case was a female of 20 years who on the 8th day of her diphtheria complained of severe headache, vomiting and slight twitching of the right hand A Babinski sign was present in the right foot Complete recovery occurred

A B Grodzki (Munchen med Wchnschr 76 709 (Apr) 1929) reports various forms of typhus encephalitis He observed a chronic encephalitis following typhus in 8 cases Chronic typhus encephalitis is localized in the central convolutions of the brain In some cases the inferior frontal convolution is affected The process is not progressive

Encephalitis and encephalo-myelitis have been reported following paratyphoid infections, whooping-cough and mumps

W J Stone and B F Sturdivant (Arch Int Med 44 560 (Oct) 1929) find 18 recorded cases of meningo-encephalitis due to *torula histolytica* The clinical course is characterized by *chronicity with moderate fever and slight leukocytosis* They report a case in a man of 51 with slight fever, and positive Kernig and Brudzinski signs The spinal fluid showed 300 cells, nearly all lymphocytes Numerous budding torula organisms were found in the smear of spinal fluid Stupor set in and death occurred in 7½ weeks *The brain was covered with a thin, white, granular exudate The meninges showed an inflammatory process, with torula organisms in them* The process closely followed the infoldings of the pia into the brain In the temporal lobe was an area of destruction and here the torula organisms were most numerous *Numerous giant cells*

*are characteristic and contain torulae.* The primary focus was in the apex of the right lung

**FAMILIAL DIFFUSE BRAIN SCLEROSIS.**—M Bielschowsky and R. Henneberg (J f Psychol u Neurol 36 131 (May) 1928) divide this into: (1) exogenous and inflammatory (Schilder's disease) and (2) the endogenous, degenerative familial forms: (a) the acute infantile type, (b) the subacute type and (c) the chronic type (Pelizaeus-Merzbacher disease) They report 2 subacute cases In one case it began at the age of 8 years and ended fatally in one year, and in another it began at the age of 10 and ended fatally by 12 The clinical course was progressive, with complete deafness, blindness, dementia and spastic paralysis of the extremities Pathologically, there were *symmetrical foci in the white matter of the parietal and occipital lobes with some extension into the cortex Both myelin sheaths and axones were destroyed* There were also foci in the cerebellum and optic nerves

**PELIZAEUS-MERZBACHER DISEASE**—This is a diffuse sclerosis Cases have been reported by W Spielmeyer, Liebers (Ztschr f d. ges Neurol u Psychiat 115 487, 1928) and others The disease is a markedly hereditary familial disease The case of Pelizaeus has been followed now through 4 generations, the healthy female always handing it on to the sons *The disease sets in early in the third or fourth month of life with tremors, followed by contractures, expressionless facies, choreo-athetotic movements, and mental deterioration* Histologically, there is *atrophy* The *myelin sheaths are gone* There are *scattered islands of well-preserved sheaths giving the sections a tiger-like*

*appearance* The arcuate fibers are intact Axis cylinders are retained

**ENCEPHALITIS PERIAXIALIS DIFFUSA** (Schilder's Disease) —This disease is being recognized more and more frequently, and there are indications that it is not as rare as was at first supposed. Recent contributions have been made by J. Collier (Proc Roy Soc Med (Sect Ophth and Neurol) 21 87 (Mar) 1928), Bouman, C. P. Symonds (Brain 51 24 (Mar) 1928), W. D. Sheldon, J. B. Doyle and J. W. Kernohan (Arch Neurol and Psychiat 21 1270 (June) 1929), Matzdorff, Jakob (Anatomie des Grosshirns, 1929) and others. The disease occurs in children but also is found in adults. *It is a progressive disease and involves chiefly the occipital and temporal regions of the brain symmetrically with resulting blindness, deafness and mental deficiency.* In Symonds' case there is evidence that a double hemiplegia may be due to this process. The pathology is characterized by a *demyelination with intactness of the axis cylinders* as a rule, with a *sparing of the arcuate fibers of the subcortex*, and with *gliosis in the white matter*. Grossly there is a *symmetrical gelatinous gray-green softening of the white matter*. Two forms are seen (1) *inflammatory with perivascular infiltrations with inflammatory cells* and (2) *degenerative without evidence of inflammation*. The cases reported have merely tended to confirm what is already known of the disease.

**ENDOCRINOLOGY.—DIAGNOSIS.**—The most outstanding recent development in the field of clinical endocrinology is the substantial analytical studies of A. W. Rowe and

C. H. Lawrence (Endocrinology 12 1, 245, 377, 591, 707 (1928), 13 1, 109, 263, 327 (1929) at the Evans Memorial Institute of Boston University School of Medicine. An objective method has been developed for the *differential diagnosis* of such endocrinopathies from the non-endocrine conditions simulating them in their clinical and laboratory evidences. The results of the application of the method to the functional disturbances of the pituitary, thyroid, gonads, adrenals, and so-called pluriglandular syndromes have been described. More than 4000 cases were studied. For each patient a complete detailed history and physical examination was made in which anthropological data were collected in *extenso*. These were supplemented by an extensive series of standardized laboratory tests as well as special tests suggested by the condition of the individual patient. The routine eye examination established a number of new facts of very real diagnostic significance.

The results can be generalized as follows: endocrine disorders appear 3 times as frequently in females as in males, about 60 per cent of the pituitary cases came before 30 years of age, thyroid diseases scatter through the first 6 decades, ovarian disorders appear in conjunction with catamenia, adrenal disease chiefly comes between 20 and 50 years.

In general endocrinopathies occur earlier than other diseases. Asthenia is a common complaint. Tremors are noted in ovarian failure as well as in hyperthyroidism. Nervousness is invariable in ovarian failure. Paresthesias are frequently reported in thyroid and adrenal patients. All of the major endocrine groups show

a high incidence of obesity. The pituitary leads with nearly 50 per cent. Overgrowth usually implies a pituitary disorder. Undergrowth likewise and also thyroid deficiency. These 2 glands also determine mental retardation. Pain, blurring of vision, and spots before the eyes are frequently reported in ovarian cases, as is tinnitus. The entire endocrine group is seemingly susceptible to colds and catarrh. A poor condition of the teeth is common, with the ovarian cases in the lead and the thyroid next. Dyspnea is frequent in ovarian failure. As a chief complaint, conditions associated with the alimentary tract are encountered in all of the endocrinopathies, the pancreas and the adrenal leading. Constipation is usual. Nocturia is common, dysuria characterizes the ovarian patients. Disorders of menstruation accompanied 15 per cent of the ovarian cases and 10 per cent of the pituitary. Thyroid cases show a higher association than the others with eczema, psoriasis, and keloid, the gonad patients with acne. Adrenal patients show frequent pigmentation. Marked varicosities are often observed in pituitary disease. Growth abnormalities of the heart show a significant frequency only in pituitary disease, though underdevelopment is associated fairly often with ovarian failure. Heart murmurs are significantly frequent in both thyroid and pituitary disease. In ovarian disorder this is strikingly absent. One in 3 of both thyroid and pituitary cases in males show abnormalities of genitalia. Vital capacity is lowered in hypothyroidism and adrenal asthenia. The body temperature is also low in thyroid deficiency, as is

the pulse rate and blood-pressure. Ovarian failure habitually records blood-pressure levels on a parity with those of pronounced thyroid failure. Hypotensive levels of adrenal failure are characteristic.

#### CLINICAL PATHOLOGY.—

Thyroid failure produces decrease in urine volume. The same tends to occur in ovarian and adrenal failure. Albumen and casts are certainly associated only with thyroid dysfunction and adrenal failure. Slight glycosuria is common in ovarian and adrenal dysfunction. Indican is found in the constipated thyroid and ovarian cases. Here too, and also in adrenal cases, is epithelial debris frequently found. Urobilinogen is frequently found in the urine in pituitary disease. The residual nitrogen tends to be enhanced in all endocrinopathies save the testicular. The urea curve shows retention in adrenal disease as does the phenol-sulphonephthalein test. MacLean's urea index is depressed in thyroid failure.

The non-protein nitrogen of the blood shows upward tendency in adrenal and thyroid hypofunctional group. Only the pituitary and adrenal cases show an increase in blood uric acid above the normal. Creatinin values are normal throughout. Blood residual nitrogen is high only in adrenal disease, it is low only in hyperthyroidism. The relationship throughout the thyroid and adrenal groups of the blood and urine analysis gives rise to the postulate that the kidney change in thyroid disease is apparent, and in adrenal failure, real. A diagnostic point of significance is the low blood sugar levels in adrenal disease. A low hemoglobin and erythrocyte count is found here also.

Leukocytes are generally normal in number. A definite lymphocytosis prevails throughout the thyroid group and in adrenal and pituitary failure. The 2 latter also show a trend to eosinophilia.

Hypoendocrinopathies usually produce a trend to lower basal metabolism while hyperfunction of pituitary and thyroid pictures the opposite. Sugar tolerance is increased in pituitary hypofunction and may be decreased in that of ovarian and adrenal failure. In pituitary hyperfunction it is increased. Hyperthyroidism may increase while hypoadrenalism may decrease sugar tolerance.

All these data are relative as well as absolute. The presence of organic or functional disease of an endocrine gland in an individual patient does not preclude the presence of other disease conditions unassociated with it directly. In fact, very many endocrine diseases will demonstrate the presence of intercurrent disease which may equal or even exceed in importance the glandular derangement. As these superimposed conditions all may influence in some measure the various individual data that make up the disease picture, due account must be taken of them. Each single test must be evaluated in the light of all related observations. Further, non-endocrine causes of departure from the normal must be vigorously eliminated by test and observation—not opinion—before the point in question can be given any weight in support of an endocrine diagnosis.

Finally, while the subjective clinical evidences are less reliable than the objective laboratory data, both are essential to the solution of the diagnostic problem. The frequent

occurrence of tuberculosis and of kidney disease in the adrenal group, and of syphilis and cataract in the pancreatic group seems significant. When any given complication occurs much oftener in the endocrine than in the non-endocrine group, it seems logical to assume a casual relationship.

### ENURESIS.—DEFINITION.—

Enuresis is defined by A. Bleyer (Am J Dis Child 36 989 (Nov) 1928) as a disturbance of micturition in which the physiologic control of the brain is blocked by stronger stimuli which have to do with the nervous mechanism of the bladder.

**CLASSIFICATION**—For the type of enuresis in which the loss of physiologic urinary control does not appear to lie in the brain, Bleyer suggested the term "*enuresis vera*" or true enuresis. To that type of urinary incontinence which is merely a perversion of habit in an irresponsible, usually neurotic and often mentally defective child, the term "*pseudo-enuresis*" was applied.

**PATHOLOGY**—P. M. Butterfield (Am J Surg 5 117 (Aug) 1928) found on cystoscopic examination of patients with intractable enuresis, definite changes at the vesical orifice, such as thickening, infiltration and lipping of the posterior portion, associated with this, there was a varying amount of residual urine.

**ETIOLOGY**—(a) Predisposing factors. The rôle played by sex as a causative factor in enuresis, is a doubtful one. Carmine Gallo (Pediatrics 35 710 (July 1) 1927) found that enuresis was more common among boys than girls, Kathleen Horton (Arch Dis Childhood 4

105 (Apr) 1929) observed that most of the cases occurred in female patients, while A Bleyer (*loc cit*) reported that his series of cases were about equally divided between the 2 sexes. An *hereditary* or *familial* history has frequently been noted (J. K. Calvin, J A M A 90 820 (Mar 17) 1928), (G Mohr and Elinor Waterhouse, Am J Dis Child 37 1135 (June) 1929), (Horton, *loc cit*). A *seasonal influence* has also been observed by Gallo, enuresis being most common in mid-winter.

(b) Immediate causes. Since enuresis is after all only a symptom and not a disease, no single factor can be assigned as a specific cause of it. Most of the factors generally claimed to be exciting agents may be grouped under 2 headings: (1) organic or physical disturbances and (2) bad habit formation.

Some of the more important causes belonging to the first group are: (a) internal glandular disturbances, (b) diseases of the central nervous system, (c) urinary changes, (d) diseases of the bladder and kidneys and (e) local irritation in the neighboring organs (Calvin, *loc cit*). Neither the relative nor the absolute causative importance of the various types of physical disturbance have been determined. Mohr and Waterhouse (*loc cit*) have found no connection between specific physical defect and enuresis, nor were they able to confirm the existence of a reversal of normal relationship between concentration of urine voided during the day and that voided during the night as had been claimed to be the case by A Friedell (Am J Dis Child 33 717 (May) 1927). They did observe, however, that the enuretic child was

in relatively poor nutritional condition and of a slightly inferior general physique. Furthermore, the patient with enuresis was found to have a less efficient cardiovascular system than the non-enuretic-control child. Bleyer could discover no definite relation existing between enuresis and such supposedly causative factors as enlarged or diseased tonsils and adenoids, eyestrain, abnormal prepuce, small urethral meatus, vaginitis, pyelitis, defective posture, and malnutrition. His conclusions were based on the fact that in some patients the enuresis was cured without removing the causative factor and in others, the causative factor was removed without affecting the enuresis. However, it must be borne in mind that, while the many defects included in this group are only infrequently the cause of enuresis, yet even when present, merely their correction does not usually control the bed-wetting because the habit has already become too firmly established (Calvin, *loc cit*).

Bleyer (*loc cit*) believes that bad habit formation due either to a lack of proper training, or to an over-sensitive nervous system, plays no part in the cause of true enuresis. It is generally believed that about two-thirds of the cases fall into the second group (pseudo-enuresis of Bleyer), (Calvin, *loc cit*, R C Hamill, J A M A 93 254 (July 27) 1929). I J Muldrew (Arch Pediat 44 429 (July) 1927) believes that enuretic patients are suffering from vagotonia, local or general. These patients are excited by stimuli not sufficient to cause a disturbance in a normal person.

The chief causes of failure to over-

come enuresis are (1) postponing the training beyond the natural age, (2) arousing fear concerning the ability to control the bladder, (3) arousing the spirit of antagonism as a result of the method of training, (4) emotional scenes on the part of the mother or nurse concerning the use of the toilet, (5) excessive "babying" by over-affection, (6) masturbation, (7) emphasizing real or imaginary ailments in the presence of the child

**PROGNOSIS**—Mohr and Waterhouse (*loc cit*) reported a cure in 7 out of a group of 15 children with enuresis. When therapeutic measures were directed to the bladder itself, Bleyer was able to correct enuresis in 80 per cent of his cases. In a group of 55 patients treated by Hamill, working on the basis of enuresis as a conduct disorder, 72 per cent were cured. Neither the age nor the mentality of the child seemed to affect the rapidity of the cure, in the patients of the last mentioned author. Without treatment, a spontaneous recovery will occur in a considerable number of patients by the eighth year, and in a great majority at puberty, only rarely does the disease persist into adult life (J McK Mitchell, *Atlantic M J* 31 469 (Apr) 1928)

**TREATMENT**—Atropine, in recent years, has fallen somewhat into disfavor. However, Calvin (*loc cit*), Bleyer (*loc cit*) and H Bakwin (*Arch Pediat* 45 664 (Nov) 1928) reported beneficial results when it was employed in sufficiently large doses. This drug seems to work particularly well in patients who have symptoms of urgency and frequency. **Massage of the bladder** by introducing the finger into the rectum has

been used as a therapeutic measure in enuresis. Again best results were obtained in those enuretic patients showing symptoms of urgency (Bleyer, *loc cit*). **Physical defects** such as were previously enumerated should usually be removed or corrected. Again, it must be pointed out that the removal of these defects, even when they are the specific cause, will not, as a rule, correct the enuresis after it has become a firmly fixed habit. Viewed as a conduct disorder, it becomes important to train the child to assume responsibility for the control of the bladder while sleeping. Enuresis is stopped when the child so desires (Hamill, *loc cit*). Fear, shame, anxiety, punishment and emotional scenes must be eliminated, and confidence must be restored in the patient and in the mother. The treatment must be carried out by a person who has good control over the patient, who has confidence in his ability to cure the condition, and who can communicate this confidence to the child. In most cases, complete recovery can be obtained within a few weeks (Calvin, *loc cit*).

**EPHEDRIN.**—Ephedrin in otolaryngology finds its greatest use in acute nasal pathology in constricting the swollen congested mucous membrane, permitting free ventilation and drainage. Tampons moistened with ephedrin are applied directly against the swollen tissues, or it is used in the form of a spray, either in aqueous or oily solution. The effects usually last longer than adrenalin and are not followed by marked vasodilation, as is seen with the use of adrenalin. One of the distinct advantages in using ephedrin lies in its oral administration with the accompanying indirect effect on the nasal mucous membrane.

The drug is of considerable value in the treatment of asthma and hay-fever. In the



latter condition large doses of pollen are tolerated with very little systemic reaction when taking  $\frac{3}{8}$  grain (0.024 Gm) ephedrin about one-half hour before and 2 hours after each pollen injection. With ephedrin to abort reactions, not only can larger doses of pollen be used, but the injections can be given more often, so that if the treatment is begun quite late in the season, the whole series of injections can be given before the appearance of the offending pollen.

**EPIDIDYMITIS.—ADENOCARCINOMA.**—A case of primary adenocarcinoma of the epididymis, in a man 22 years old, is reported by A. J. Scholl (J. A. M. A. 91: 560 (Aug. 25) 1928). Prior to operation, a diagnosis of tuberculosis was made, the chest was negative by x-ray for tumor or tuberculosis. At operation, microscopic examination revealed malignancy and the testis, with its covering and cord, was removed. Three months later, a mass appeared below the lower angle of the incision and then the mass and surrounding tissue, together with the inguinal glands, were removed. Four months later, 4 liters (quarts) of blood-stained fluid were removed from the right chest. The x-rays now revealed a tumor mass in the region of the hilum of the lung.

**EPIDIDYMITIS.**—That it is not possible to produce a chemical epididymitis is the report of H. C. Rolnick (Surg. Gynec. Obst. 47: 806 (Dec.) 1928). The author advises epididymotomy early to prevent permanent damage.

In an experimental study, upon rabbits, of the motility of the vas deferens, S. Frey (Deutsche Ztschr. f. Chir. 218: 333, 1929) comes to the conclusion that movements of the vas deferens are not responsible for the

development of inflammation of the epididymis or testicle.

Non-tuberculous non-gonorrheal epididymitis is discussed and 326 cases are reported by M. F. Campbell (Am. J. M. Sc. 176: 386 (Sept.) 1928). Of 3606 cases of epididymitis admitted to the urologic service of Bellevue Hospital 3000 were gonorrheal and 280 tuberculous in origin. The balance, 326 or 9 per cent, were both non-tuberculous and non-gonorrheal. The organisms most frequently encountered in the latter cases were staphylococci, streptococci and colon bacilli. Early and thorough surgical intervention is indicated by the fact that of the 79 cases of this series operated upon, a third eventually lost the testicle by suppuration. Clinical observation shows that this is not due to surgical error, but rather to the extreme virulence and pyogenic character of the invading organism. Without operation in the cases in which surgery is indicated, a still larger number of testicles are sacrificed by suppuration.

**TREATMENT.**—In a study of 3000 cases of *gonococcal* epididymitis at the Bellevue Hospital, New York City, M. F. Campbell (Ann. Surg. 86: 577 (Oct.) 1927) discusses various palliative measures, none of which are of much value. However, the author feels that rest in bed, the application of a suspensory and the use of ice to affected part do more good than any of the palliative measures as sera, vaccines, foreign proteins, etc. If the severe pain persists, surgical intervention should be given at the end of 48 hours. Early operation may decrease the secondary complications and possible sterility is no objection since sterility is no greater after operation than before. Open epididym-

otomy by the Hagner method is the procedure of choice

In a comparison of the results of various treatments for acute *gonorrheal* epididymitis, E Stone (J Urol 20:245 (Aug) 1928) comes to the conclusion that **epididymotomy** gives immediate relief of pain in a large number of cases and earlier relief than any other form of treatment in the majority of cases

**Autohemotherapy** was used in 24 cases of *gonorrheal* epididymitis by M Scharman (Wien klin Wchnschr 40 1384 (Nov 3) 1927) The author took blood from the veins of the patients and injected the unchanged blood immediately intramuscularly Starting with 3 c c he adds 1 c c every second day, until a maximum dose of 7 c c is reached There is immediate relief and a complete subsidence of symptoms, after about 10 days patients were able to leave the hospital

**Calcium chloride**, in doses of 0.5 to 1 Gm ( $7\frac{1}{2}$  to 15 grains) in dilute solution, intravenously, was used daily for 4 or 5 days in the treatment of epididymitis by E Rupel (Am J M Sc 176 399 (Sept) 1928) The author describes 50 cases without it and 22 cases with it, in comparing the 2, the latter group obviously recovering more quickly Relief from pain and tenderness, without exception, follow its use even if the patient resumes his work daily Likewise Z D Zau (Nat M J China 14 368 (Dec) 1928) reports 58 cases treated in this manner, all with good results

**TUBERCULOUS**—In a review of 94 cases, H L Kretschmer (Surg Gynec Obst 47 652 (Nov) 1928) attempts to determine whether or not patients who were operated on lived longer than those who were treated

without surgery, whether or not the causes were different in groups, and finally, the cause of death of 78 patients who were operated upon, 16 are dead and 57 are living Five cases are unknown There were no immediate deaths, but the conditions causing death occurred at varying periods after the patients left the hospital Tuberculous meningitis, pulmonary tuberculosis and miliary tuberculosis were the 3 most frequent causes of death In the fatal cases in which operation was not done, 8 in all, miliary tuberculosis and tuberculous meningitis were the most frequent causes of death One case died 16 days after operation of pulmonary tuberculosis which was advanced at the time of operation Operation was done to give the patient comfort because of the vast amount of pus discharged from multiple sinuses One of the patients not operated upon lived 11 years after diagnosis was made, death being due to pernicious anemia

M Oppenheim (Wien k Wchnschr 41 1421 (Oct 11) 1928) tested 25 patients by the tuberculin reaction in the urethra The old tuberculin was brought into the pars pendula penis which is lined with stratified columnar epithelium (In his old method he used the fossa navicularis) Ten gave a positive reaction In 9 of these cases tuberculosis already existed or was suspected The 15 other cases were negative

In a review of the literature and an analysis of 300 cases observed at the Mayo Clinic prior to January, 1923, Bumpus and Thompson are convinced that dysuria is a symptom of urinary tuberculosis and does not occur when the disease is confined to the genital

tract They feel that conservative treatment, consisting of **epididymectomy** and **heliotherapy**, offers a better prognosis than more radical measures Kenneth M Walker (Lancet 2 367 (Aug 20) 1927) is also of the opinion that conservative treatment is most generally of value Only in advanced cases of tuberculous vesiculitis and prostatitis should the radical operation be performed as a primary measure Likewise, J D Barney and F H Colby (J Urol 19 657 (June) 1928) express the same thought and conclude that many patients with tuberculosis of the genitals eventually die of pulmonary or miliary tuberculosis instead of the genital condition

For the past 6 years G Wolfsohn (Med Klin 24 957 (June 22) 1928) has used tuberculin (Rosenbach) for the local treatment of circumscribed accessible tuberculosis The author first evacuates any hydrocele fluid by aseptic puncture of any demonstrable cold abscess, 0.1 cc tuberculin, to which about 0.5 per cent procaine solution is added to counteract pain is then injected The injection is repeated after an interval with from 0.1 to 0.2 cc tuberculin The reactions following are relatively severe

**EPILEPSY.—ETIOLOGY**—Epilepsy as a clinical entity has been exhaustively studied in the past several years W G Lennox and S Cobb (Medicine 7 105 (May) 1928), in a review of work done to the present time, have demonstrated that certain conditions may tend to precipitate certain convulsive seizures (1) poor oxygen supplied to the brain tissues, (2) alkalosis either by ingestion of alkali or hyperpnea (blowing off car-

bon dioxide), (3) edema, (4) increased permeability of the tissues to fluids, and (5) increased intracranial pressure It is well known that any one of these factors in the presence of an unknown cause tends to increase or bring on seizures which are recognized clinically as epileptiform in character

E M Landis (Am J Physiol 83 528 (Jan) 1928) has shown that a poor oxygen supply in tissues produces increased permeability of the tissues to fluid, so that fluid passes through tissue walls at approximately 4 times the normal rate Increased intracranial pressure is associated with a disturbance of cerebrospinal fluid circulation and also an increase in the fluid pressure Alkalosis may cause edema and edema is apt to develop over the cerebrocortex in this condition With this increase in pressure, there is delay of absorption with consequent back-pressure and the convulsive state may occur

Basing his researches upon these preliminary important observations and using the method of encephalography developed in 1919 by W E Dandy, of Johns Hopkins Medical School, Temple Fay, of Philadelphia, has studied a large series of cases which were suffering from the convulsive state more popularly known as Epilepsy He showed there was a definite increase in the cortical fluid in long standing cases of convulsive seizures The reason for the accumulation of this fluid was undertaken by N W Winkelman in a series of neuropathological studies T Fay had previously offered the hypothesis that disease, trauma or impairment of function within the Pacchionian bodies, the normal outlet for cerebro-

spinal fluid might be demonstrated by the method of encephalography. This was proven N W Winkelman then showed a definite and variable pathology in 150 brains that were studied. He found evidence of recent hemorrhage within the structure of the Pacchionian granules, causing swelling and obliteration of the cerebrospinal fluid pathways, inflammation, atrophy, sclerosis, improper development, etc., have been found as outstanding factors in this study, epileptic brains showed marked involvement or failure to develop normal Pacchionian granulation system.

In the light of these brilliant observations water metabolism takes on a new importance. L G Rowntree (J Pharmacol and Exper Therap 29 135 (Oct) 1926) demonstrated that major convulsive attacks could be produced in normal animals within 4 hours by simply introducing large quantities of fluid through a stomach tube. L H Weed and P S McKibben (Am J Physiol 48 531 (May) 1919) also showed that distilled water by vein induced convulsions in from 35 to 65 minutes and when introduced into the spinal canal, L H Weed and P Wegforth produced convulsions within 10 to 12 minutes. Conversely when fluid was drained and cerebrospinal fluid was allowed to escape during the period of water introduction, the convulsive attacks could be terminated at any time. After studying the control of intracranial pressure seen in acute phases of trauma, tumor, eclampsia and alcoholism by means of dehydration and hypertonic solution, they applied this principle to the treatment of epilepsy and undertook a systematic dehydration of certain selected cases of this disease.

**TREATMENT.**—In the beginning of his studies from the therapeutic angle, that is in 1927, Fay (E A Strecker and T S Fay Pennsylvania M J 32 687 (July) 1929) used only those patients suffering from *grand mal* who had failed to respond to the usual treatments of luminal or ketogenic control, the other sedatives of bromide, quinine, etc. Absolute co-operation on the part of the patient was demanded. This ruled out those individuals mentally deficient and definitely subnormal from the psychic aspect. Liquid intake and urinary output were charted for a period sufficient to find out what the normal balance of the patients proved to be. An encephalogram then was made to find out if any gross evidence of cerebral change or fluid distribution was present. Then the patients were put on a **limited intake** of from 8 to 20 ounces (240 to 600 c c) of liquid per day, including water, milk, tea, coffee, soup, etc., depending upon the severity of the convulsive attacks. **Magnesium sulphate**, in doses of from 1 to 3 ounces (90 c c) in 6 ounces (180 c c) of water given by mouth on alternate days, was employed in some cases to hasten dehydration. T Fay found out that within from 6 to 12 days a definite change in the type of seizures occurred. The *grand mal* attacks diminished in number after 3 days and disappeared ordinarily before the tenth day except in 1 instance. In 2 patients the *grand mal* attacks gave way to *petit mal* attacks which have persisted in spite of rigorous dehydration, but have not interfered with the patients' normal routine.

Strecker and Fay (*ibid*) warn that the dehydration treatment must be controlled with the same exacting

care that is given to the patient suffering from diabetes or other disorders. The method falls short if the patient exceeds the fluid level of compensation established for them. T. Fay determines this by studies of the urinary output. If output is more than intake, fluid is being obtained either through the food or surreptitiously. He has held patients on a 12 ounce (360 c c) total fluid intake for over a year without any injurious effects and 6 to 10 ounce (180 to 300 c c) levels have been held for many weeks without any injury to the patient whatsoever. T. Fay believes that dehydration and limitation of fluid intake may be followed over a long period of time with no deleterious effects to the patients, and that the limitation tends to prevent excessive cerebrospinal fluid accumulation over the cortex of the brain, the presence of which in the light of his mechanical theory of epilepsy may dispose the individual to a convulsive attack.

**CONCLUSION**—In concluding a recent important article, T. Fay and N. W. Winkelman (Am J Psychiat 9:667 (Jan) 1930) state that (1) encephalography has called attention to widespread areas of increased fluid collection and cerebrocortical atrophy, confined to the cerebrospinal fluid circulating pathways over the brain. (2) N. W. Winkelman has shown a definite pathology of the Pacchionian body. (3) The pathology may predispose or give rise to impairment of cerebrospinal fluid elimination and consequent accumulation of fluid producing pressure along the cords of the cortical pathways. (4) Gross cortical atrophy which has been commonly recognized, has been analyzed

from a standpoint of tumor, vascular, inflammatory and increased fluid accumulation and a definite type of pressure atrophy has been differentiated from that arising in cases of cerebral vascular occlusion. (5) Atrophy probably arises from fluid accumulation and pressure. These brilliant researches have been of substantial use in treating otherwise hopeless cases of *grand mal*.

**EPISTAXIS.**—The most common site in bleeding from the nose is Kieselbach's area, *ie*, in the anterior part of the nasal septum. This area contains large mucous glands and when much dusty air is inspired, most of the dust settles in this area. The mucous glands are stimulated to hyperproduction of mucus and a thick paste of dust and mucus results here. An irritation is set up and, as a consequence, a thin crust is formed. In the attempt to remove the crust, by either blowing or picking the nose, the epithelium is destroyed and an ulcer forms. The blood-vessels are easily injured and hemorrhage follows. Other sites of bleeding as noted by G. B. McAuliffe (M J and Rec 129:6 (Jan 21) 1929), are (1) the upper portion of the nose near the root of the middle turbinate in arteriosclerotic cases, (2) the middle of the septum from the presence of polypus, (3) the convexity of the inferior turbinate or the floor three-quarters back, and (4) from scattered nevi throughout the nose. Compensatory bleeding from the ethmoidal veins or from the inferior turbinate deep in the nose may occur in elderly people with high blood-pressure.

**ETIOLOGY.**—Nasal hemorrhage occurs in many conditions such as

nasal diphtheria, typhoid, purpura, leukemia, high altitudes, trauma, vicarious menstruation, following intranasal operations, etc F Curtius (Klin Wchnschr 7 2141 (Nov 4) 1928) in a study of 86 boys and men with habitual epistaxis (septum varices), found that 72 presented signs of status varicosus in other parts of the body An instance of familial *telangiectasia hemorrhagica hereditaria* (Osler's disease) is discussed In 4 generations, comprising 31 persons (18 males and 13 females), this disease occurred 7 times and hernia 5 times In 2 cases the conditions were found together In the second generation a man with *telangiectasia hemorrhagica hereditaria* and hernia married a woman with hernia Phlebectasis appeared in all parts of the body The authors recommend that, in all cases of habitual epistaxis, search be made for other manifestations of dysplasia of the venous walls

**TREATMENT** of epistaxis depends on whether the bleeding is coming from the anterior portion of the septum or elsewhere When from the former area, the hemorrhage is usually checked with **adrenalin** moistened tampons The offending vessels are then **cauterized** usually with a **chromic acid** bead and immediately after cauterization the area is sponged with **saturated sodium bicarbonate solution** **Trichloroacetic acid** and the **galvanocautery** are also used

When the bleeding comes from an obscure source, **packing** is usually resorted to, and the **Bellocq pack** lends itself to greatest use This is not free from danger, as is shown by A O Davy's case (M J Australia 1 423 (Mar 30) 1929) The patient complained of severe epistaxis of spon-

taneous origin off and on for 4 days Repeated packing of the nose failed to control the bleeding until post-nasal plugs were inserted Three days later the patient complained of an earache in both ears and the next day, because the condition had become worse with both drums bulging, double paracentesis was performed Profuse purulent discharge was obtained Several days later there was definite double *mastoiditis*, with considerable pain and tenderness over both mastoids, and a double **mastoidectomy** was done and the patient made a complete recovery

Various preparations of **hemostatic serum** may be of value and **calcium chloride**, 15 grains (1 Gm), in repeated doses, has given excellent results

If all means of checking the hemorrhage fail, **ligation of the external carotid artery** may be done After a consideration of the surgical technic involved, B H Abraham (Arch Otolaryng 8 29 (July) 1928) reports a case of serious recurrent nasal hemorrhage following an operation on the right ethmoidal and sphenoidal sinuses, wherein ligation of the right external carotid artery proved effective

### **ERGOSTEROL—VIOSTEROL.**

The name "viosterol" has been adopted officially by the Council on Pharmacy and Chemistry of the American Medical Association to denote ergosterol activated by exposure to ultra-violet light Ergosterol, itself, is an optically active sterol with definite crystalline form and melting point, it is obtained from yeast After exposure to ultra-violet light, it takes on maximum vitamin D powers, is dissolved in a

bland vegetable oil and standardized biologically. Gravimetric measurements are not standard. One unit of vitamin D is the total quantity needed to produce a continuous line of calcification across the rachitic metaphysis of the radius or ulna of a standard rachitic rat under standard conditions.

Evidence is rapidly accumulating showing that a deficiency of vitamin D is quite common in various foods, particularly in human milk, naturally depending on the mother's supply of this necessity. Obvious deformities of rickets need not develop; the more insidious effects of slight deficiency may be serious handicaps in later life. E. V. McCollum and N. Simmonds insist that the development of sound teeth is a dietary problem. Limited vital capacity caused by constriction of the thorax and pelvic malformations are other conditions sometimes of dietary origin. (K. Blunt and R. Cowan (J. A. M. A. 93 1301 (Oct 26) 1929))

**DOSAGE**—The dosage of a standardized product is somewhat as follows: 8 to 10 drops daily for normal infants, children and adults. For the treatment of rickets, 5 to 7 drops 3 times daily. During pregnancy and lactation, 20 drops per day. Naturally, these doses are merely suggestions.

**UNTOWARD EFFECTS**—Vioosterol, however, also had untoward actions, although the doses used in animals to obtain them is much higher than ordinarily used in humans. Large doses seem to cause severe intoxication, loss of weight and death. Extraordinary deposits of calcium were found in the heart, blood-vessel walls, stomach, lungs, kidneys

and muscles. Vomiting and gastrointestinal disturbances have been noted in humans. K. Ochsenius (Monatschr f Kinderh 43 58, 1929) in his own child, aged 8 months, observed an idiosyncrasy whereby even 1 drop produced bile-stained vomiting.

**THERAPEUTICS**—A. F. Hess, J. M. Lewis and H. Rivkin (J. A. M. A. 93 661 (Aug 31) 1929) state that irradiated ergosterol or viosterol is specific for rickets, tetany and osteomalacia. Other clinical conditions may be benefited, but the data thus far are too meager. Not only as a cure, but as a preventive of rickets is the product of value, of course, with different dosages. Differentiations are also made of premature and exceptionally rapidly growing infants.

As might be expected ergosterol has been used in a variety of conditions.

The healing of fractures, especially delayed union, are said to be favorably influenced by viosterol.

Resistance to certain infections has been increased experimentally by viosterol. For instance, A. H. Grant, B. Suyenaga and D. E. Stegeman (Am Rev Tuberc 16 628 (Nov) 1927) increased the resistance of white rats to tuberculosis by feeding calcium and vitamin D. W. Eichholz and H. Kreitmair report marked reduction in mortality of mice infected by pneumococci.

**Osteomalacia** yields to this product.

In expectant and nursing mothers, vitamin D feeding is an excellent prophylactic of carious teeth as well as a preventive of early rickets in the child.

C. J. Bond (Brit M J 1 339 (Mar. 3) 1928) used viosterol as a wound dressing with favorable results.

**ERYSIPELAS —TREATMENT.**

—K E Birkhaug (J A M A 90 1997 (June 23) 1928), during the last 3 years has actively immunized 68 patients by means of gradually increasing doses of *Streptococcus erysipelatis* toxin alone or with a mixture of the toxin and the killed streptococci. The author suggests that the existence of a state of bacterial allergy accounts for the recurrent attacks of erysipelas strictly within previous sensitized anatomical areas.

L R Montel (Presse med 36 668 (May 26) 1928) recommends local applications of *antistreptococcic serum*. He states that the action of the serum is specific, as it gives no results in staphylococcic infections, and seems to produce a local surface immunity.

W S McCann (J A M A 91 78 (July 14) 1928) states that previously published reports on the value of serum in the treatment of erysipelas, are of little value because of the lack of controls. From the small series of cases that he has observed he believes that, as a matter of fact from a comparison with the statistics of previous years, the duration of stay in the hospital and the mortality rate are worse in serum-treated patients than in the untreated patients he observed before the advent of serum.

E Zapatero (Siglo méd 83 600 (Apr 20) 1929) has used wet dressings of *Besredka's antiviral* in the treatment of facial erysipelas and has had good results. These dressings were applied at 12-hour intervals during the first 2 days and then at 24-hour intervals for 2 more days.

R Volk (Wien klin Wchnschr 41 746 (May 24) 1928) states that in order to avoid recurrences in erysip-

elas of the face, which in most cases has its origin in the mucous membrane of the nose, the painting of disinfectants, like *ichthyol glycerine*, *Pregl's solution*, *hydrogen peroxide* and *iodine* internally is advisable.

**ETHMOIDITIS.**—Ethmoiditis is an inflammation of the ethmoid cells and is usually due to an extension of an infection into the cells from an accompanying rhinitis. Treatment depends on whether or not an acute or chronic form of the disease is present.

In *acute* ethmoiditis the treatment is principally symptomatic and the attempt is made to promote ventilation and drainage of the cells. This is done by shrinking down the mucous membrane with *cocaine* and *adrenalin solution*, followed in a few minutes with *silvol tampons* which are allowed to remain in the ethmoid area for 15 minutes to a half hour. This treatment favors osmosis and at the same time reduces the infection.

Ethmoiditis *in infants and children*, especially when accompanied by orbital complications, presents many difficulties in the manner of treatment. C F Theisen (Arch Otolaryng 8 363 (Oct) 1928), in a study of 31 cases, found in the 6 youngest, sinusitis, eye and orbital complications. Their ages ranged from 2 to 20 months. The diagnosis of sinusitis in all cases was based largely on x-rays. Orbital complications, particularly orbital abscess, made radical operation on the ethmoid bone imperative. In such cases an external operation was performed. An infant, aged 10 months developed orbital abscess about 10 days following the onset of nasal discharge which came from the ethmoids. In the



cases of ethmoiditis in young children with external rupture, the rupture usually occurs at the inner angle of the eye, with the appearance of an infiltration and swelling. In young infants, spontaneous rupture may follow closely an acute ethmoiditis.

The great tendency in the treatment of *chronic* ethmoiditis is conservatism. R. H. Skillern (Brit. M. J. 2: 562 (Sept. 29) 1928) divides chronic infections of the ethmoid roughly into the suppurative and non-suppurative types. Those of the first type are characterized by a purulent secretion, with a more or less wide spread catarrhal inflammation in the ethmoid region, and those of the second type by polypoid hypertrophy or true polyp formation. The basic treatment of all sinus infections, particularly those in which the ethmoid is involved, is **ventilation and drainage**. In the mildest cases of the *suppurative* type, removal of the middle turbinate combined with treatment by medicated tampons is often sufficient. Complete exenteration is indicated when there is combined suppuration affecting the entire labyrinth. In the *hyperplastic* type of ethmoiditis, the polyps that are present should be removed with their bony attachment.

**EUGENICS.**—The avowed purpose of the eugenicist is the betterment of the human races through breeding of the fit and prevention of breeding of the unfit. Present practical activity is directed along two channels: that of birth control and that of sterilization of the feeble-minded and the insane. While these efforts are in reality dysgenic rather than eugenic, the end-result sought is racial betterment. In the field of

birth control, England stands well to the fore in information available. On the other hand, N. E. and V. C. Himes (Hosp. Soc. Serv. 19: 578 (June) 1929) in a concise review of the situation state the deplorable fact that the class it is most desirable to reach, namely, the defectives, is not being touched by the clinics. Briefly, the clinics are serving the unskilled, they are aiding the skilled to considerable extent, but have been so far powerless to limit the reproduction of those fertile individuals in the community who constitute a serious problem—the feeble-minded, the insane, the chronic paupers, and the persistent leaners on the state. In order to reach the first two groups the Eugenics Society has presented to parliament the First Draft of a Sterilization Bill. The gist of this proposed enactment is that at the request or with the consent of a feeble-minded or insane person, or a parent, or the Board of Control, sterilization may be effected. Further, it is to be enacted that if a mental defective marries whilst an order under the Mental Deficiency Act is still in force, the local authority may, with the consent of the Board of Control, appeal to the court to declare the marriage void.

### EXOPHTHALMIC GOITER.

See GRAVES'S DISEASE.

**EXOPHTHALMOS**—Exophthalmos without hyperthyroidism was observed by L. Hausman and W. Bromberg (Arch. Neurol. and Psychiat. 21: 1402 (June) 1928) in a boy 3½ years old, who developed polyuria and prominence of the eyeballs. The *diabetes insipidus* was very marked, with an intake of about 6000 c.c. (6 quarts) daily and a corresponding

output In addition to the progressive exophthalmos and the diabetes insipidus, there was progressive dysostosis spreading to the parietal, orbital, malar, and mandibular areas, the sella was normal in all plates

**PULSATING. — TREATMENT.** — J M Wheeler (Atlantic M J 31 812 (Aug) 1928) reports 5 cases of pulsating exophthalmos and draws the following conclusions

1 Digital compression should be begun as soon as the diagnosis is made There is a remote possibility of repair of the arterial lesion by organization, and in any case compression is proper preparation for ligation of the common carotid Digital compression may be safely practiced several times a day for periods of 15 minutes

2 Incomplete blocking of the common carotid on the affected or more affected side is usually in order as a first operative step Later, complete blocking may be effected with section of the artery

3 If further relief is necessary, the second common carotid may be operated upon in the same way after a few weeks and after preparatory digital compression If the bruit is localized in the region of the superior ophthalmic vein, this vein should be ligated in preference to the second common carotid

4 In any case with considerable protrusion, secure adhesions should be obtained between the lid margins and firm pressure applied with a gauze dressing and pressure bandage In this way the protrusion can be held in check and the cornea safeguarded

**TRAUMATIC** — F Terrien (M Press 128 271 (Oct 2) 1929) discusses the causes of exophthalmos

and reports a case due to traumatism in a patient who woke up and found that his eyeballs had become prominent He stresses the use of x-ray in searching for the cause which in this case revealed the presence of a revolver bullet of large size lodged in the roof of the left orbit, and projecting into the cranium opposite the frontal lobe The bullet became encysted and interference was therefore deemed inadvisable

**EYELIDS. — HERPES ZOSTER (Ophthalmicus)** — In a case of blepharitis due to herpes virus reported by H B Andervont and J S Friedenwald (Bull Johns Hopkins Hosp 42 1 (Jan) 1928), the eruption on the eyelids in no way suggested herpetic infection, and except for the history of previous vaccination would have been regarded as a typical example of accidental infection with vaccine virus From this case a virus was obtained which, when inoculated into rabbits, produced lesions and symptoms similar to those produced by the herpes virus Animals surviving infection with this virus were immune to typical strains of herpes virus This strain, however, exhibited a difference from other strains of herpes virus in that the intracranial infection of rabbits could be elicited only after a long series of corneal passages

**TREATMENT** — J S Friedenwald (Bull Johns Hopkins Hosp 45 103 (Aug) 1929) reports the use of convalescent serum in an unusually severe instance of ophthalmic herpes zoster Five days after the onset of the cutaneous lesions and 11 days after the onset of the neuralgic pains, the patient was given an intramus-

cular injection of 8.5 c c of the blood serum of another patient who, 6 weeks before, had recovered from a severe case of perineal herpes zoster. Five hours after the injection the patient was more free from pain than she had been since the onset of the attack. By the next morning the edema of the lids had markedly decreased, and from this time on the skin rash rapidly subsided.

**PTOSIS.—TREATMENT**—In the operation for ptosis described by G. S. Derby (Am J Ophth. 11: 352 (May) 1928), an incision is made through the skin down to the tarsus along the edge of the lid just above the lashes, and the upper lip of the skin is dissected back far enough to allow the hammock of fascia lata to fit under it and to be covered. Then, as in the Machek operation, 2 tunnels are made under the skin to points somewhat above the eyebrow and a mosquito clamp is passed downward through each tunnel. In the next step, 1 end of a strip of fascia lata from 7 to 9 cm long and 1 cm wide is placed in each clamp, the fascia is drawn up into position, and, with a full-curved needle, the fascia on one side is sutured with one or more deep stitches of silk or catgut to the frontalis as close to the periosteum as possible. The *fascia-lata hammock* is then pulled tight and the other end is sutured to the frontalis in a similar way.

At the conclusion of the operation the lid is held firmly elevated by the strong fascial band and the ptosis is over-corrected. The palpebral fissure is filled with White's ointment and covered with gutta-percha tissue and a dressing is worn for a week. At the end of that time the stitches are

removed. It is not necessary to suture the incision in the skin along the lid margin. The strip of fascia lies on the tarsus and the skin covers it.

Following a review of the literature on the **Motais operation** for ptosis, W. W. Weeks (Am J Ophth. 11: 879 (Nov.) 1928) described a suture for the superior rectus tendon slip which he has found to be secure. The tendon slip is carried through a sub-conjunctival tunnel on to the anterior surface of the tarsus and supported by a fold of the levator tendon.

D. B. Kirby (Arch Ophth. 57: 327 (July) 1928) described a modification of the **Motais operation** for ptosis which can be done through a skin incision alone and in 12 cases has given good clinical results. A horizontal incision 25 mm long is made through the skin and orbicularis to the tarsus about 8 mm above the lid margin. The aponeurosis of the levator is then followed backward to 8 mm above the tarsal border, another horizontal incision is made through the levator down to Tenon's capsule, and this capsule is opened on the temporal side of the superior rectus muscle. A tongue of muscle and tendon 4 mm wide is then fashioned and a double-armed silk suture passed through it 2 mm from its end. The muscle strip is transplanted to a pouch formed anterior to the tarsus. The needles are passed downward, piercing the lid margin just nasal to the center of the cornea, and the suture is tied so as to draw the muscle tongue and lift the lid to the desired position. A second suture is introduced to support the first one and to secure accurate and firm apposition to the tarsus.

**PLASTIC RECONSTRUCTION.**

—In plastic reconstruction of the 4 eyelids, E Payr (Arch f klin Chir. 152 532, 1928), distinguishes 4 types of plastic operations (1) The plastic with the use of adjoining tissues, (2) the Italian method, (3) the use of pedicled flaps, and (4) skin transplantation

He reports the case of a patient 32 years of age who sustained third-degree burns of the face and head from the explosion of gasoline in an automobile accident. The 4 eyelids and the nose and ear were involved in the injury. Restoration of the lids could not be attempted until several months later, after the neighboring tissues had healed as well as possible. Because of the marked scar-tissue formation, neither a plastic with the use of adjoining tissues nor skin transplantation could be considered. Payr, therefore, used the Italian method, forming the right lower lid from tissue of the right upper arm, the left lower lid and the bridge of the nose from tissue of the left upper arm, the right upper lid of skin from the dorsal surface of the left hand, and the left upper lid from a pedicled flap from adjoining tissues.

Payr emphasizes the suitability of the skin of the back of the hand for plastics of this kind. He performs the Italian plastic under local anesthesia. In the fixation of the arm in the necessarily very uncomfortable position rigid dressings are avoided, dependence being placed on adhesive plaster dressings which leave the joint free. Payr has found **cellopan** very satisfactory as a support for dressings and uses it also in Thiersch grafting. To alleviate the discomfort, which at times becomes considerable,

caused by the posture he prescribes **arcanol** and **cibalgine**.

**ECTROPION, CICATRICIAL.—**

J W Taylor (South M J 22 634 (July) 1929) reports the cure of ectropion by a free **dermic graft**. The patient, age 20 months, was large for his age and in perfect physical condition. Seven weeks previously he had fallen, producing an abrasion near the outer canthus of the left upper lid. This later became infected with abscess of the lid. It was opened by the family physician. He made an incision in the lid extending from the outer to the inner canthus. Erysipelas followed, involving the upper lid, forehead and temple. There was complete destruction of the left upper lid except for 1 or 2 mm of the lid margin containing the cilia. The lid margin was adherent to the skin just below the eyebrow. There was a great amount of edema of the exposed conjunctiva, but no involvement of the cornea. The edema well protected the cornea from exposure.

Under gas-ether the lid, with the cilia attached, was dissected loose. All scar tissue was carefully removed except on the area beyond the external canthus which did not affect the lid. There was such a large area of raw surface to be covered (20 x 30 mm) that he hesitated to follow Wheeler's suggestion and take a graft from the opposite upper lid, especially since the cicatrix was keloid in character. It was decided to take a dermic graft from the opposite temple. The graft was taken slightly larger than the area to be covered. The size of graft was outlined and with a sharp knife an incision was made through the skin. It was then dissected free from the

underlying tissue with scissors. All areolar tissue was removed and the graft was sutured in place, using fine paraffin silk. The lids were sutured together in 3 places. Vaseline and rubber tissue were used over the inlay, then gauze fluffs and a pressure bandage. He stressed the ease with which these cases can be handled and the satisfactory results obtained.

**CANCER.—TREATMENT** — S. de Vries (*Nederl Tijdschr v. Geneesk* 72 3904 (Aug 11) 1928) reports the histories of 12 patients with cancer of the eyelids, treated with x-rays. Only 4 were cured. Of the remaining 8, 3 were subsequently cured by radium treatment. Thirty-seven patients were treated with radium. The first of these was given a small initial dose and was not cured. Four had been "vaccinated" against radium (the cancer cells made insensitive to the rays by small doses) elsewhere. With 1 exception these were not cured by the later irradiation. The remaining 32 were treated

in 1 sitting, the application lasting for 24 hours in most cases. Thirty patients were cured, in 7 cases the cure has lasted from 5 to 11 years, in 5, from 3 to 5 years, in 10 from 1 to 3 years; and in 8 from 6 months to 1 year. A prosthesis of paraffin or rubber about 3 mm thick, is used to protect the eyeball.

**SYRINGOCYSTOMA** — S. S. Greenbaum (*Am J Ophth* 11 275 (Apr) 1928) states that syringocystoma of the eyelids occurs in both sexes, but more frequently in the female. It is most common in the lower lid and does not disappear spontaneously. It is manifested by the formation of skin-colored discrete lesions the size of a pin-head which are elevated above the skin. These lesions consist of tracts of cylindrical epithelium with canals running through them or with definite cystic cavities. They are to be distinguished from milia, xanthelasma, molluscum contagiosum, and trichoepithelioma.

## F

**FEEBLE-MINDEDNESS — ETIOLOGY** — According to P. L. Schroeder (*J A M A* 92 100 (Jan 12) 1929) many children owe their behavior difficulties to cerebral injuries at birth. He quoted the figures of G. B. Smith that 62 per cent of a group of infants with birth injuries later showed some degree of feeble-mindedness. His own series of children was studied with regard to type of delinquency, mental age, education achievement, personality and the like. One group of 146 had various degrees of birth paralysis.

Both types had similar characteristics of mental retardation, although the former had differences in behavior probably due to their physical handicaps. The two most common characteristics of all the children studied were hyperactivity and distractibility and the writer believed these two symptoms should be classed as manifestations of mental retardation, due to cerebral injury incurred usually in difficult, protracted labor.

However, in a statistical review of 10,455 mentally retarded children in the Massachusetts public schools, N.

A Dayton (Am J Psychiat 8 979 (May) 1929) demonstrated that the majority were not the first born nor the last of a large family and concluded that other factors than trauma at birth or exhaustion of the mother affected mental retardation of the child. In a subsequent statistical study of 14,379 retarded children, Dayton (New England J Med 201 245 (Aug 8) 1929) observed that low mentality was not dependent on physical deformities. In fact, some of the more severe physical handicaps such as defective sight or hearing were associated with the least variation from normal intelligence. Underweight and the so-called stigmata of degeneration were found most frequently among children with impaired mentality. This author believed that feeble-mindedness and the stigmata of degeneration denote a defective germ plasm.

In hope of finding a more definite physical basis for mental disturbances, H K Kahle (Arch f Psychiat 86 766, 1929) studied the blood of 343 feeble-minded children. He discovered a lymphocytosis and a slight increase in the number of eosinophils in the majority of his patients. He described changes in the capillary network of the nail beds of mentally deficient children which he thought were fairly characteristic.

The relation of feeble-mindedness to criminality was discussed by G L Wallace (Ment Hyg 13 93 (Jan) 1929) who divided feeble-minded persons into 2 groups, those with low mental intelligence and those with low social intelligence. In his opinion most of the crimes are committed by the latter group who have an intelligence quotient above 70. The high

percentage of feeble-mindedness found among criminals, he believed, is due to the ease with which they are caught and their lack of social position and influence. These things frequently assist the more intelligent to escape sentence in court.

F P Gengenbach and F G Ebaugh (Southwestern Med 13 256 (June) 1929) attributed 5 per cent of all behavior problems to feeble-mindedness. To promote earlier recognition and more thorough study of these conditions, they advocate an intensive education of medical students in mental hygiene and psychopathology, the training of special social workers in this field, routine mental measurements in every developmental study and a closer co-operation between the pediatrician and psychiatrist.

**FINGER-PRINTS.**—It is self-evident that the hospital and its staff benefit jointly with parents and children in the protection afforded by an adequate method of identification of the new-born, as stated by Harold Cummins (New Orleans M and S J 81 493 (Jan) 1929). Fingerprints owe their usefulness as marks of identity first of all to the infinite variety of the integumentary features. The epidermal ridges are fashioned into diverse patterns and the total variation is tremendously increased by the occurrence of many variable features in the single ridge. Each finger-print is a unique specimen. Herschel carefully compared his own finger-prints made at the age of 26 and at the age of 83, without detecting any changes in even the most minor detail.

The apical patterns, the ones which are found on the balls of the

fingers, are frequently found in the form of whorls. The formation according to the Henry System, of a given hand as 32-32, means that there is a whorl on every finger. Certain fingers are more apt to show whorls than others, for example the thumb and index are very apt to have whorls while they are seldom found in the ring and little finger.

### FISTULAS.—BRANCHIOGENOUS FISTULA OF THE NECK

of complete type is reported by J M Barajas y de Vilches (*Siglo médico* 84 85 (July 27) 1929). A patient, aged 13, had a congenital fistula of the neck, with an external orifice at the anterior border of the right sternocleidomastoid muscle and an internal orifice in the larynx. X-ray examination following the injection of iodized oil showed the fistulous tract to be 11 cm long. It was resected completely, under local anesthesia, with a 1 per cent solution of procaine hydrochloride and epinephrine.

**DUODENAL FISTULA** constitutes a very troublesome type and occasionally occurs after operation on the gall-bladder or right kidney in which the duodenum is damaged. G Razzaboni (*Arch ital di chirurg* 24 253 (July) 1929) found it difficult to produce these fistulas in dogs by direct injury to the duodenum, but comparatively easy with the irritation of drainage. Very small fistulas may possibly heal, but the larger ones are serious, owing to the digestive action of the duodenal fluid on the tissues, the hemorrhage, and to the effect on the general health. Diagnosis is made by examination of the discharged fluid. Unless the fistula is

very minute, operative treatment is indicated. Razzaboni prefers, first, a simple jejunostomy, followed later by a more radical treatment of the duodenal lesion. It is, of course, important to protect the skin and adjacent tissues from the erosive action of the duodenal fluids.

Patel and Carcassonne (*Paris méd* 2 221 (Sept. 14) 1929) had a recovery after the use of calcium chloride. A man aged 29 developed a duodenal fistula 11 days after resection of a duodenal ulcer. In 24 hours, his condition became critical, and vomiting followed every attempt at nourishment. He was given 12 Gm (3 drams) of calcium chloride in solution together with subcutaneous and rectal injections of dextrose and physiologic solution of sodium chloride. The wound was covered with zinc oxide ointment which was renewed every hour. Forty-eight hours later, small and repeated amounts of food were tolerated. Fifteen units of insulin were given daily by intramuscular injection, and in 6 weeks the wound closed.

**BILIARY.**—When all of the bile escapes to the surface through a fistulous tract, an anemia usually follows. The bile salts excreted diminish in amount and a large percentage of the digestive fat appears in the stools in the form of fatty acids (from 45 to 58 per cent, according to Umber). There is an associated inability to properly utilize the vitamins of fat (A and D), together with an altered mineral metabolism, resulting in a true osteoporosis of bone, complicated occasionally by spontaneous fractures as observed by Pavlov 24 years ago and later described by Seidel in man. Despite the decalcifi-

cation of the bones, the serum calcium remains normal. More calcium is lost in the stool through the diminished fat absorption than is lost through the bile. An hypertrophy of the parathyroids has been described by Dieterich, accompanying the osteoporosis of biliary fistula. Duttman found an acidosis in biliary-fistula animals, caused by the loss of the alkaline bile. The non-protein nitrogen of the blood and the plasma chlorides, however, remain normal.

To correct the anemia, diminution in bile-salt formation, interference with the digestion of fat and osteoporosis, which also may occur in a patient with complete obstructive jaundice when the bile is excluded from the intestines, special diets have been commended. Animals with complete external biliary fistula subsist without deterioration in health on cooked liver, a salmon and bread diet, or on cod-liver oil and ergosterol added to an ordinary mixed diet. With the total exclusion of bile from the intestine, carbohydrates and protein are better assimilated than fat, but following the administration of bile salts by mouth in sufficient quantity, fat should continue to be absorbed in the normal manner. Tammann was able to obviate the occurrence of osteoporosis and spontaneous fractures in biliary-fistula animals by the parenteral administration of ergosterol.

According to O. H. Wangensteen (J. A. M. A. 93: 1199 (Oct 19) 1929), the only advantage that biliary fistula exhibits over biliary retention is that liver injury incident to obstruction of the bile ducts does not obtain in the former. The so-called cholemia de-

pendent on the retention of bile and especially biliary salts, he believes, has been overrated as a toxic factor in jaundice patients. Ordinarily, patients tolerate obstructive jaundice well until the destruction of liver tissue occasioned through the block in the common bile duct causes threatening symptoms.

In irremovable complete obstruction of the bile duct, external biliary drainage is unwise in the presence of an uncorrected complete biliary obstruction. In irremovable complete obstruction of the bile duct, an initial anastomotic operation to the stomach or duodenum is the procedure of choice. Only when the risk of the operative procedure would be notably decreased by performing external drainage should the increased hazard of external over internal drainage *per se* be accepted. For obstructions above the point of union of cystic and hepatic ducts in the biliary system, when a primary anastomotic procedure cannot easily be performed, external drainage, followed later by implantation of the fistulous tract into the duodenum, as suggested by Lahey, is perhaps most desirable. Twenty-two cases of external drainage for congenital cystic dilatation of the common bile duct were reported by McWhorter. All the patients died without complete recovery. Only those recovered who had a permanent stoma between the bile duct and the intestine. A number of the patients died of hemorrhage after the establishment of an external fistula, which may occur, Kuttner observes, in the absence of an immediate antecedent jaundice.

Wangensteen (*loc cit*) reports 2



cases exemplifying great loss of strength and deterioration in health incident to the protracted external loss of bile

In the case of a boy 4 years of age, reported by H Williams and R. H. Smithwick (Ann Surg 89 942 (June) 1929), *biliary fistula* developed after drainage of a cyst the size of a grapefruit, adherent to the undersurface of the liver. For 9 months, all of the bile drained externally through the sinus, which closed intermittently, with fever, nausea, and constipation. After a *pre-operative preparation* by transfusion the administration of oxgall by mouth, an abdominal exploration was performed, the gall-bladder found to contain thick mucus, and a cystic duct to enter the fistulous tract  $1\frac{1}{4}$  inches below the abdominal wall. After removal of the gall-bladder and cystic duct, the fistulous tract was found to be continuous with the common duct, but the latter was obliterated at its duodenal end, and an anastomosis was made between the end of the fistulous tract and the side of the duodenum with No 0 plain catgut and an outer layer of fine continuous silk sutures. This was followed by uneventful convalescence.

**ARTERIOVENOUS**—The dilatation of an artery distal to the fistula is explained by E Holman (Arch Surg 18 1672 (Apr) 1929), as due to the development of an extensive collateral circulation so that the main current of blood flowing through the fistula is supplied from the artery distal to the abnormal communication. Experimentally, distal dilatation of the artery can be produced by establishing an arteriovenous fistula and the free flow of blood through the fistula. The area of lessened resist-

ance at the site of the fistula also attracts a large volume of blood from the collateral bed, and the blood reaching the fistula through the distal artery which dilates in response to the increased bulk of blood flowing through it. In the experimental animal, dilatation of the heart may occur in the presence of a fistula with the proximal artery ligated, indicating that a considerable volume of blood is being short-circuited from the collateral circulation, through the fistula. Clinically, ligation of the proximal artery alone is contraindicated, because there is danger of gangrene, or if gangrene is averted, because failure to cure the fistula invariably follows. As is well known, dilatation of the heart and of the artery and vein on the proximal side of a peripheral fistula is the usual accompaniment of an arteriovenous fistula, if the fistula is sufficiently large and of sufficiently long duration. Progressive dilatation of the fistula, accompanied by progressive dilatation of the heart introduces a vicious circle which under certain conditions can end only in complete cardiac decompensation.

**URINARY**—One with an unusual orifice, which was situated immediately below the center of Poupart's ligament in Scarpa's triangle, is recorded by A C Turner (Lancet 2 220 (Aug 3) 1929). The left kidney was fibrosed, half the normal size, densely adherent to the surrounding structures, and contained numerous calculi. As it was not possible to do a nephrectomy or a decapsulation, the kidney was split from pole to pole, and 6 calculi were removed. The kidney was left open and drained. Two months later, the

sinus had closed, the **nephrotomy** wound had healed, and the patient was discharged in an improved condition

**URETERAL**—For ureteral fistulas, J Sénèque (Presse méd 36 1330 (Oct 20) 1928) believes that suppression of the function of the kidney by means of **x-ray irradiation**, as recommended by Klein, is preferable to nephrectomy. In the 4 cases in which this treatment has been applied in man, the function of the kidney was suppressed in a very short time, and there were no harmful after-effects

It has been shown by animal experimentation that if sufficient irradiation of the kidney be made, its function will be seriously impaired and finally cease altogether. P Klein (Zentralbl f Gynak 52 1500 (June 16) 1928), of Prague, reports that in 4 cases of ureteral fistula following the Wertheim operation, which could not have been helped except by nephrectomy, he was able to obtain complete relief by irradiation of the kidney on the side of the injury

**FOCAL INFECTION.**—Forty-three cases of septic disease, originating in the oral and pharyngeal cavities, have been observed by Claus (Med Klin 25 457 (Mar 22) 1929). The majority of them were cases of *pyemia* following angina. The author states that the diagnosis is generally difficult. The anamnesis is important. An angina usually precedes the condition. The angle of the jaw is sensitive to pressure. Chills are frequently observed. The face has often a cyanotic or subicteric appearance. In children, in whom chills are usually not observed, the disease is character-

ized by an intermittent fever. The blood picture in *pyemia* is distinguished by leukocytosis and by a shifting to the left of the blood formula. *Pyemia* after angina leads generally to multiple pulmonary infarcts and metastases to the kidneys

The pathogenesis is not completely clear. Some authors believe that it is caused by thrombosis of the veins, while others assume that the disease originates in the lymphatic vessels. The author states that he found small abscesses in apparently healthy tonsils. Of the 43 patients quoted, 23 recovered and 20 died. The author concludes that early diagnosis and correct treatment may give more favorable results

A large majority of foci of infection are found in the ear, nose and throat, according to H W Lyman (Ann Otol Rhinol and Laryng 36 903 (Dec) 1927). Tonsils, adenoids and paranasal sinuses are often a factor in general disease. Otitis media and mastoiditis in infants may cause grave *gastro-intestinal disturbances*. In *deafness* of a non-suppurative character, the underlying cause is frequently a low-grade chronic infectious process. In the absence of disease of the labyrinth or central nervous system, *vertigo* is usually due to toxic irritation from an infected focus. Focal infection may cause striking psychic disturbances and is an etiological factor also in *arthritis*, *cardiac conditions*, and acute *hemorrhagic nephritis*. The author reports 2 cases of hemorrhagic nephritis in which the eradication of foci of infection was followed by good results

The intestinal canal as a source of focal infection is stressed by Anthony

Bassler (Physical Therap 46 384 (Aug) 1928)

The true origin of the bacteria is in the intestine, although they later may be found in the teeth, tonsils, etc. In addition, the intestinal canal is the most important cause of toxic factors in the human body. One hundred and sixty-two different organisms from the human intestinal canal have been identified, and of these, 55 have been proven to be definitely pathogenic.

**TREATMENT**—Vaccine must be used with caution in chronic diseases, according to E C Rosenow and A C Nickel (J Lab and Clin Med 14 504 (Mar) 1929). If the dosage of vaccine is gauged so that the local and constitutional reactions are relatively slight, the tolerance may often be greatly increased, even tenfold, and the patient improves, a result in accord with that of Wherry and others in bronchial asthma. If the dosage is too large, tolerance may not increase but actually diminish, reactions may become progressively more marked with each succeeding injection, and the patient's condition grow worse. The authors feel that this narrow limit of effective dosage, determined more by the reaction in the patient than by the number of bacteria, and the use, without bacteriologic diagnosis, of stock vaccines made from bacteria long cultivated in the laboratory, have contributed much to the general disrepute into which vaccine therapy has unfortunately fallen.

In determining the disposition of foci, R L Haden (Ann Otol, Rhin and Laryng 36 896 (Dec) 1927), states that factors influencing the patient's resistance must be evaluated and the structural damage already

done must be considered. Often the systemic disease is dependent upon continuous damage over a long period of time. Eradication of the foci may avail little.

When the removal of foci is indicated, all possible foci should be removed.

The experimental and clinical study of focal infection emphasizes the important relation of foci to systemic disease and the need for early recognition and removal of foci before systemic disease has resulted.

**FRACTURES.**—Recent fracture literature yields but little new material. Advances in our management of skeletal injuries during the past thirty years may be summed up as: The general use of anesthesia for reduction, x-rays for diagnosis, exact replacement by open operation, fragment fixation by buried metal plates, the application of autogenous bone graft to ununited fractures and the early use of skilled massage and passive motion to restore full limb function. Recent articles mainly deal with statistics from world-famous clinics, as to the relative frequency of fracture types, emphasize the advantage of certain long-accepted principles in treatment and give us the same end-results that were taught in our schools a decade ago.

**FRACTURE OF CRANIUM**—J A McCreery and F B Berry (Ann Surg 88 890 (Nov) 1928) report the results of their study of 520 cases of skull fracture in adults. About 70 per cent had a fracture of the base. The symptoms were the classical ones. The cranial nerves most frequently involved were the seventh and eighth. Meningitis occurred in 17 cases (3.4

per cent) The x-ray diagnosis was of value only when positive Along the line of treatment early and repeated lumbar puncture gave the greatest aid In the majority of cases the pressure was reduced to normal by one spinal tap Repeated spinal taps were more effective in reducing pressure than was the administration of magnesium sulphate by mouth or rectum Operation in the first 12 hours is of little value except in epidural hemorrhage Later operation is done for localized symptoms Most deaths occur in the first 48 hours from concussion About 50 per cent of skull fractures made a complete recovery, although final abatement of symptoms may not occur until two years after the injury F Selberg (*Deutsche med Wchnschr* 54 2099 (Dec 14) 1928), on the contrary, asserts that on examination of 8 patients from 1 to 7 years after their injury, that not 1 was entirely free from some head discomfort, but that all were able to resume their occupations Symptoms complained of were headache, irritability, deafness, tinnitus, dizziness and alcoholic intolerance

**FRACTURE OF SPINE**—Hugh Thompson (*South M J* 22 682 (July) 1929) clinically divides spine fractures into 2 groups Those with and those without paralysis Those showing evidence of spinal block by the Queckenstedt test are treated by immediate laminectomy Those without paralysis are treated by recumbency for 2 to 3 months, usually without a plaster shell, followed by a spinal brace or corset worn for 1 to 2 years Spine fusion operations are not done routinely but are reserved for cases which do not respond to

conservative treatment R B Osgood (*New England J M* 199 861 (Nov) 1928) agrees with Thompson's plan of treatment A Muller (*Deutsche Ztschr f Chir* 194 220 (Jan) 1926) of the German school on the other hand recommends a spine fusion operation routinely soon after the accident He claims to cut the period of disability in half Chevanuez, Grimault, Guillemain, Magnus and Ott from French and German sources, review 262 cases of fracture of the transverse processes of the lumbar vertebræ They emphasize the importance of the condition in compensation insurance Failure to recognize the condition may mean a permanently crippled back Every severe traumatism of the back should be x-rayed, as a diagnostic measure to differentiate fracture from lumbago or myositis Fracture is treated by prolonged recumbent immobilization to prevent later chronic neuritis Cases with persistent pain should have the broken transverse process excised Dowman prevents bladder infection in spine injury by doing routinely a suprapubic drainage in all cases of bladder palsy, and introducing a self-retaining catheter

**FRACTURES OF NOSE**—These are characterized by external and internal nasal deformity, subcutaneous edema and emphysema, and hematoma of the septum The object in treatment is to restore the shape of the nose and permeability of the fossæ Treatment must be given early as consolidation takes place in from 5 to 10 days The first 24 hours is the ideal time If seen after 24 hours, treat by cold compresses and intranasal alkaline washes until the primary swelling is reduced, usually about the fifth

day As a rule intranasal deformity can be corrected from within the fossæ under good illumination and cocaine anesthesia Tampons or an Asche tube may be necessary to hold fragments in place Tampons are changed daily until the fragments hold, and not put in so tightly as to spread the vault of the nose In depressed or lateral deformity of the bridge some form of external fixation splint is necessary Jassemin (New England J Med (Nov 11) 1927) uses a piece of soft strap iron  $\frac{3}{4}$  inch wide by less than  $\frac{1}{16}$  inch thick This is bent up in the middle by a pair of pliers into an appropriate triangular shape, with lateral flanges extending out over the cheeks The bend over the nose is made high enough to avoid downward pressure The splint is properly padded and held in place by adhesive strips applied to each end extending out over the face, under the ears, and around the back of the neck Another adhesive strap is attached at the apex over the bend for the nose and extends well up on the forehead The vertical strip is held well in place by a horizontal strip across the forehead The splint is worn for about 7 days P C Huet (J de chir 31 649 (May) 1928) substitutes a piece of copper for the iron strap, a material perhaps easier to work up and keep in place

**FRACTURE OF LOWER JAW**—Recent literature shows a pleasing standardization in the treatment of uncomplicated jaw fracture V P Blair (J A M A 93 232 (July 20) 1929), F Risdon (Canad M A J 20:260 (Mar) 1929) and Fry (Proc Roy. Soc Med 22 663, 1929), agree on the following plan Delay operative interference until after the third day.

Up to that time use a supporting jaw bandage, cleanse the mouth with an alkaline wash, and feed on liquid diet. Set the fracture under local novocaine anesthesia and nerve block If the teeth are present in both jaws, use the sound jaw as a splint wiring the teeth of the broken jaw to its fellow by the hook and eye method, *i e*, pass loops of wire around the teeth on each side of the bone break and twist into an eye anteriorly Make corresponding loops and eyes on the hook wire In case of accidental vomiting, etc, release the jaws by cutting the hook-wire only This can be replaced at any later time without discomfort to the patient The practicability of this method was demonstrated during sea sickness, while moving broken-jaw soldiers from France to England during the World War An interdental splint is used if teeth are absent in one or both jaws The patient's own plates of false teeth make an excellent interdental splint In children external wiring is best A restless child will not tolerate an interoral apparatus Bone grafting for non-union is done through an outside incision Cases are fed on liquids given through a tooth interspace or sucked through the teeth Nasal feeding is rarely necessary Use an alkaline mouth wash freely after operation Complications are rare C Tenormant and M Darcissac (Bull et mém Soc nat de chir 53 503 (Apr 2) 1927) in bilateral fracture of the horizontal ramus, with forward displacement of the posterior fragments, sufficient to cause a horizontal tilting of the teeth in the anterior fragment, pull back the posterior fragment one week after the accident by exposing the angles of the jaw through bilateral incisions, drill-

ing the bone and passing a loop of copper wire through the holes. Bandages are passed through the wire loops and tied across the back of the neck over a gauze compress. The apparatus was removed in two weeks with a perfect result.

**FRACTURE OF CLAVICLE**—E. L. Eliason (J. A. M. A. 91:1974 (Dec. 22) 1928) and C. W. Lester (Ann. Surg. 89:600 (Apr.) 1929), in their summaries which, combined, amount to 922 cases, show nothing new in statistics or treatment. They emphasize the following facts. The clavicle is the bone most frequently broken in childhood. 41 per cent were children under 10 years of age. The recumbent treatment, *ie*, lying flat on the back, is the only one which gives union without deformity. The other 84 ambulatory methods of treatment which they have collected give union with some degree of deformity. But that this deformity does not interfere with shoulder function and largely disappears in time. Because of these conclusions, Tester properly suggests that the complicated, uncomfortable ambulatory dressing should be discarded and one of the older standard types of simple, more comfortable dressing be used. It is a clinical fact that after the *pros* and *cons* of treatment have been explained to the broken-clavicle patient, the average man will choose an ambulatory method and the average woman the recumbent method of treatment.

**FRACTURE OF UPPER END OF HUMERUS**—R. Zanoli (Chir. d. org. di movimento 12:445 (Aug.) 1928) reports statistics in 162 fractures of the upper end of the humerus treated at the Rizzoli Institute, Bologna. They include fractures of the head,

anatomical neck, surgical neck, surgical neck with dislocation of the head, epiphyseal separation and greater tuberosity. Fifty-one were uncomplicated fractures of the surgical neck, 9 per cent surgical neck with dislocation, 30 per cent fractures of the great tuberosity with dislocation. If one considers the latter group as properly coming under the head of dislocation, fractures of the surgical neck constitute 86 per cent of breaks at the upper end of the bone in his series. There were 2 cases of nerve palsy. Some type of shoulder dislocation occurred in 25 per cent of cases. Cases with little displacement were treated by a plaster-of-paris dressing with the arm in half abduction, outward rotation, and held slightly forward. Cases with much displacement were treated by extension with the patient recumbent. Eighty-two per cent were treated by non-operative methods. Operation was done for irreducible fracture, irreducible fracture-dislocation and vicious union (2 per cent). The results of operative and non-operative treatment were equally as good. Where follow-up results were possible, 86 per cent gave good functional results.

**FRACTURES ABOUT THE ELBOW**—M. Camurati (Chir. d. org. di movimento 12:452 (Aug.) 1928) reviews 328 fractures about the elbow joint occurring at the Rizzoli Institute, Bologna. Supra-condyloid fracture of the humerus was the most frequent type (34 per cent). Dislocation accompanied this fracture in 12 per cent of cases. A primary nerve lesion occurred in 6 per cent, the radial being the nerve most frequently involved. A marked degree of joint ankylosis followed in 20 per cent of

supra-condyloid fractures Treatment by acute elbow flexion (Jones's position), was the method of choice in all except olecranon fracture, where a straight anterior arm splint was used Open operation was done for irreducible displacements of the condyles and epicondyles, olecranon process, head of the radius, and joint ankylosis Satisfactory function resulted in 88 per cent of all elbow fractures, crippling ankylosis in 12 per cent

**COLLE'S FRACTURE OF THE RADIUS**—A series of 786 cases of Colle's fracture of the radius reported by E D Grasby and S R Trick (Brit M J 1 391 (Mar 2) 1929), H. Edwards and E B Clayton (Brit M J 1 61 (Jan 12) 1929) and V. Eskelund (Acta chir Scandinav 62 41, 1927), present a general agreement as to cause, symptoms and treatment of this frequent bone injury The following points are emphasized The cause is a fall on the extended hand with the arm held stiff, or back kick while cranking an automobile The deformity is the typical silver fork, due to backward displacement of the hand with the lower fragment There is displacement of the hand toward the radial side and prominence of the head of the ulna The most important point in treatment is perfect anatomical reduction under anesthesia Reduction is obtained by the familiar procedure hyperextension, traction and flexion of the hand pulling the attached lower fragment with it, or by resting the lower end of the upper fragment on a large wooden wedge, holding it there firmly by the left hand, while the right hand grasps the patient's hand and lower fragment and forces it downward, forward and toward the ulnar side Once

the bones are properly reduced most any type of splint will hold them, the choice being either an anterior moulded plaster-of-paris splint with the hand flexed, or the straight posterior board splint of Scudder with the hand extended Perfect results are reported in 93 per cent of cases A much better average than one is accustomed to seeing, and giving the impression that the figures are tinged with a spice of optimism.

**FRACTURE OF FINGERS**—M Fenger (Ugesk f Laeger 90 935 (Sept 27) 1928) claims Zuppinger's method in transverse fracture of the phalanges can be used by any practitioner and gives 100 per cent recovery The fractured finger, for its entire length, is fixed by strips of adhesive plaster to a straight strip of lead the width of the finger The lead strip is then bent at an angle of 45 degrees in every joint, beginning with the distal joint and the fragments slide automatically into correct position The lead strip is left in place from 8 to 12 days The finger becomes functional in 4 weeks The principle involved is that traction exerted on an elastic body, stretched over a non-elastic body, is in a straight line tangent to the arc The hand flexed and bound over a roller bandage will usually give the same results as the lead splint E L Eliason (Am J Surg 6 501 (Apr) 1929) dresses a "sparring" or Barton's fracture at the base of the proximal phalanx of the thumb, by a light spica cast with the thumb in abduction

**FURUNCULOSIS (BOILS)**—**TREATMENT**—The use of ultra-violet ray for furunculosis is suggested by M L Blatt (Radiol Rev and Chicago M Rec 50 388 (Oct)

1928) because of the formation of an active hyperemia which is a factor in the elimination of infection and production of local immunity. They further claim that since the ultra-violet ray influences both calcium and phosphorus metabolism, it is, therefore, quite possible that the activation of these ions are effective in this disease through their secondary influence upon the phagocytes. This writer (*Arch Physical Therap* 8 520 (Oct) 1927), in cases of furunculosis of infants, incises the lesions first and then exposes the infant to violet ray from 3 to 5 minutes at a 15-inch distance. A general treatment at 20 inches is then given, of short duration.

When to open a boil is a debated question. B. N. Lingeman (*J Indiana M A* 22 270 (July) 1929) finds little benefit from incision in the early stages. Many cases get well without the incision. He prefers to wait until pointing occurs.

The use of a chamber plaster is advocated by W. Mayer (*Munchen med Wchnschr* 76 838 (May 17) 1929) who reports excellent results. It obviates the shortcomings of bandages. The furuncle is first opened under ethyl chloride. Then the ointment chamber is applied. It consists of a piece of adhesive plaster, in the center of which is a circular opening which is covered with cellophane. Around this cellophane window on the adhesive side is a circu-

lar pad of felt. The chamber thus formed is then filled with a special ointment consisting of camphor, phenol and ichthyol. The core of the boil is extruded in 3 or 4 days. The window can be opened and fresh ointment applied as is necessary.

In a series of 100 cases with this method, Ruf (*Munchen med Wchnschr* 76 839 (May 17) 1929) reports good results. He compares 2 cases, 1 treated as above and the other treated with moist compresses. The chamber plaster method caused quicker healing and a smaller scar. Likewise, Krafft, in the same issue, reports a series of 50 cases with equally as good results.

In a series of 66 cases of furunculosis in which the bacteriophage treatment was given, N. W. Larkum (*J Michigan M Soc* 27 106 (Feb) 1928) obtained favorable results in all but 1 case. The treatment consists of subcutaneous injections, on 2 successive days, of 2 c c (32 minims) of the lysed filtrates containing the bacteriophage. Reactions have been slight or absent. No further injections are required in the majority of cases.

The hypodermic injection, on alternate days, of sodium cacodylate is recommended by B. Ghosh (*Indian M Gaz* 63 128 (Mar) 1928). Not more than 4 injections are necessary, as a rule, before all the boils healed and others do not appear.

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**GALL-BLADDER.—ANATOMY**—R. P. Rowlands (*Brit M J* 2 963 (Nov 23) 1929) found the gall-bladder to vary in position and size,

at times it was absent, frequently was contracted or very large as a result of disease and sometimes was so adherent as to be difficult to define and



unsafe to remove The cystic duct was often long, running parallel with and adherent to the common hepatic duct, or very short, or absent The normal arrangement of the arteries was found by Flynt in only 69 of 200 consecutive dissections

M G Beaver (Arch Surg 19 321 (Aug) 1929) in reviewing the anatomy, finds the so-called normal angular junction of cystic with hepatic duct occurs in about half the cases Long and short parallel types of cystic ducts occurred in more than one-third and are probably the most common cause of accidents in biliary surgery The cystic and hepatic ducts in such cases are closely bound together with fibrous tissue to such extent as to often be inseparable and appear as one The large remaining portion of the cystic duct may dilate, and symptoms may recur There are no valves of Heister in that parallel portion Spiral ducts are more easily torn off by traction than straight ones Accessory hepatic ducts occur in 87 per cent 4 out of 5 are right-sided The length and diameter closely correspond to normal

**PHYSIOLOGY**—The 3 distinct, normal activities of the gall-bladder are (1) Expulsion of its contents by muscular contraction, (2) concentration of its contents by the absorption of water, (3) secretion of mucus The mechanism of expulsion, though not definitely understood, apparently is instigated by the ingestion of food and is most effective when this food is pure fat, variable when it is protein and carbohydrates have no effect The mechanism is by the contraction of the gall-bladder musculature as demonstrated by x-ray examinations of specimens injected with iodized

oils and observation of peristalsis. This mechanism, according to L R. Whitaker (Arch Surg 18 1783 (Apr) 1929), is activated by the liberation of some substance which enters the circulation and stimulates the musculature occurring even in completely denervated gall-bladders, indicating that reflexes are not essential The intravenous injection of highly emulsified fat is as effective in emptying the gall-bladder as an extract of duodenal mucosa That acid from the stomach acting on the duodenum is not essential is shown by the evacuation of the gall-bladder after feedings in the presence of highly alkalized stomach contents. The concentrating function of the gall-bladder increases the reservoir efficiency of the organ If emptying is insufficient, over-concentration with precipitation may occur The secretion of mucus perhaps facilitates evacuation of the bile and may be pronounced

In some cases the ability of the mucosa to absorb solid or semi-solid material may become abnormal, thus cholesterol is absorbed by the mucosa until pedunculated masses are developed in the rugi, which may break off and form the nuclei of stones Relationship of infection to *gall-stone* formation may be causative or coincidental although it is probable that infection and inflammation of the wall of the gall-bladder tend to inhibit the musculature thereby inducing stasis This results in concentration and precipitation

According to V G Burden (Am J Surg 3 556 (Dec) 1927), the serious consequences of the diseases of the gall-bladder far exceed its functional importance and its removal is

justifiable if it is giving rise to symptoms even though it is only slightly diseased. The gross and histologic anatomy of the organ favors stasis and retards recovery from infection. The filling of the gall-bladder is apparently due to an increased intraductal pressure sustained at 100 to 150 mm of mercury by the tone of the sphincter of Oddi. The gall-bladder empties through the cystic duct by its own muscular power which is sufficient to overcome this intraductal pressure. Food is the normal and most efficient stimulus to emptying. The parasympathetic is the motor nerve of the gall-bladder and the inhibitor of the sphincter of Oddi, and the sympathetic as usual acts reversely. The phenomena of the findings of cholecystography are directly related to the mechanism of the sphincter of Oddi and pertain only indirectly to the condition of the gall-bladder. Diseases of the gall-bladder cause delay in emptying, accumulation of highly concentrated residual bile and failure to acidify the bile, thus favoring the formation of stones.

W. W. Daniel and E. H. Greene (South M. J. 22: 977 (Nov.) 1929) report a case of systemic infection with *Bacillus fecalis-alkaligenes* following cholecystostomy for stones, which resembled typhoid. They believe more careful laboratory study in cases of prolonged fever will raise the incidence of this infection probably often considered typhoid or paratyphoid.

**PATHOLOGY** — Soejima (Deut. Ztschr. f. Chir. 212 (Nov. 28) 1929) is convinced of a *cholemic hemorrhagic diathesis* that is caused not by icterus but by the functional disturbances of the liver. It is not specific for icterus only, though it occurs most often in

that disease (40 per cent). It also occurs in latent icterus (38 per cent) and in non-icteric cases (13 per cent). Obstruction of the common bile duct by malignancy furnishes the largest number of these cases because there is progressive obstruction and hepatic insufficiency. In long-standing icterus—when without apparent reason there occurs suddenly a gradual regression of the icterus—it sometimes happens that blood coagulation is increased. The reason is that bile stasis has impaired liver function with resultant lessened bilirubin formation. Icterus cannot be regarded as the only factor in alterations of coagulation time and the 2 factors do not run parallel in experimental work. However, bile does check coagulation because of its anti-thrombin action. It has no effect on fibrinogen or calcium. Bile acid of not less than 0.1 per cent also checks coagulation.

Surgical experience indicates that most cases are exacerbations and extensions of pre-existing foci, often due to obstructed bile flow. As the obstruction persists or infection increases it may go on to pus formation in the ducts, to large or small abscesses of the liver and eventually to destruction of the liver function. Of the clinical divisions, the acute is catarrhal or suppurative. The chronic form resembles hepatitis and biliary cirrhosis and is characterized by recurrent attacks of fever, slight jaundice, and painful swelling of the liver. It often occurs after operations on the biliary tract, the trauma relighting latent infection.

The symptoms are those of infection plus biliary dysfunction. The liver is mottled and has rounded edges

in contradistinction to the grayish blue, with radiating lines of fibrous tissue seen in biliary cirrhosis. The condition closely resembles catarrhal jaundice, but moderate jaundice with fever and definite illness differentiate it from the catarrhal in which the jaundice is prominent and the symptoms mild.

It is suggested by J. E. Sweet (Ann Surg 90 939 (Nov.) 1929) that the function of the gall-bladder is to receive and return to the body the bile which is formed during a period when it might otherwise be lost. Carrying this concept to intra-uterine life when no digestion is going on in the fetal intestine might explain the presence of *icterus neonatorum*. If the bile was not removed from the fetal circulation by the placenta, jaundice would occur until the introduction of fat opens the ampulla of Vater. It might explain the increased bilirubin regularly found in fetal blood in pregnancy during which the bile salts steadily increase, and the well-established relationship between pregnancy and gall-stone formation. If the gall-bladder empties through the cystic duct, the element of stasis enters into the problem of *gall-stones*. If the gall-bladder is an organ of absorption gall-stones will appear if this absorbing mechanism is incompetent, as in *cholecystitis*, or if the material coming to the gall-bladder is non-absorbable. This last supposition may explain gall-stones in a practically normal gall-bladder and would indicate that gall-stones are not necessarily a product of the gall-bladder. The removal of the stones or the gall-bladder or both in such cases would not necessarily cure these patients.

C. J. Baumgartner (Surg., Gynec. and Obstet 49 780 (Dec) 1929) groups pathological lesions of the gall-bladder into 10 varieties from an examination based on the gross appearance of 4575 specimens removed at operation, with microscopic examinations of 50 of each of the larger groups and of all of the smaller groups, and with comparison against the history in from 25 to 50 cases in each group.

1 *Chronic catarrhal cholecystitis* (44.8 per cent) characterized by slight pathological changes in the organ itself, but associated with a definite history or surrounding evidence of pathology such as round-edged liver, hepatitis, or sentinel lymph node, with varying degrees of edema, congestion of the villi and lymphocytic infiltration. Stones were present in 61 per cent. This suggests that stones in an otherwise normal gall-bladder are found during a quiescent period.

The symptoms in this group were gastric disturbance, usually gastric distress, nausea, vomiting, belching, regurgitation, flatulence, constipation and varying degrees of pain. Of this group 61 per cent were women. Tenderness was elicited in the right upper quadrant in 74 per cent.

2 The strawberry gall-bladder of *cholesterosis* (23 per cent) of which 50 per cent were associated with stones, 43 per cent with definitely thickened walls, and 14 per cent with papillomata. Of this group 69 per cent were women. The average duration of symptoms was 6 years and the symptoms were practically the same as in Group 1.

3 *Chronic fibrous cholecystitis* with marked hyperplasia of the fibrous tissue as a result of long continued

inflammatory process (7 per cent) There was thickening and contraction of the wall with scar tissue and loss of elasticity The mucosa was partially or wholly replaced by connective tissue and there was lymphocytic infiltration Stones were present in 89 per cent, 75 per cent were women and the average duration of symptoms was 9 years The symptoms were usually more severe and of longer duration than the former types A history of jaundice was present in 30 per cent and chills and fever in 10 per cent

4 *Subacute and acute cholecystitis* (69 per cent) In this group there was active inflammatory reaction, the walls being injected, edematous, and infiltrated with leukocytes The streptococcus was the most common offending organism Ninety-six per cent contained stones, 50 per cent showed marked chronic fibrous cholecystitis In 75 per cent there was gall-bladder colic, 10 per cent had chills and fever and in 33 per cent the gall-bladder was palpable There was marked tenderness in practically all cases

5 *Empyema* (23 per cent) Stones were present in 96 per cent The history of biliary disease in 90 per cent was of long standing with repeated colic In 10 per cent it was relatively short This group did not show a severe reaction, temperature and leukocyte count being very slightly elevated The gall-bladder was palpable in 24 per cent

6 *Gangrene* (13 per cent) In 96 per cent of this group stones were present and 50 per cent were men The patients were all distinctly ill with marked tenderness in the right upper quadrant, chills and fever in

20 per cent, temperature and leukocyte count slightly increased in only half of the cases and a mass was palpable in only 30 per cent Rupture due to gangrene was noted about once in every thousand cases

7. *Hydrops* of the gall-bladder (34 per cent) Obstructive stones were present in 96 per cent of these, the remaining cases apparently being secondary to inflammatory or other mechanical obstruction A history of gall-stone colic was given by 80 per cent The symptoms were much less than in the previous group and a mass was palpable in 18 per cent

8 *Papilloma* (9 per cent) Papillomata were single or multiple and stones were present in 30 per cent In no case in this series was there evidence of malignant change The symptoms were those of cholecystitis in general

9 *Adenoma* (05 per cent) The tumor was situated in the fundus of the gall-bladder and varied from 4 mm to 3 cm in diameter One-fourth of these specimens also contained calculi The symptoms were those of cholecystic disease

10 *Malignant lesions* The incidence in this series was 03 per cent as contrasted with the average of 2 to 4 per cent Carcinoma simplex and adenocarcinoma were most common, with squamous cell, epithelioma, papillary carcinoma, and sarcoma occurring rarely Calculi were found in every case The histories of this group were divided into 3 headings

(a) Twenty-two per cent, symptoms of an apparently harmless cholecystic disease

(b) Seventy per cent, long history of repeated attacks of colic with a sudden change in the past 1 to 3 months,

characterized by severe pain, anorexia and progressive loss of weight

(c) Histories were relatively short, in which the malignant phase occurred coincidentally with the first symptoms of cholecystitis. Patients lost on an average of 30 pounds (13½ kilograms) in 6 months. In half of the cases a mass was palpable, in 3 there was jaundice. Blood findings and gastric analyses were essentially negative.

**DIAGNOSIS** —R. P. Rowlands (Brit. M. J. 2 963 (Nov. 23) 1929) advises routine simple radiography which reveals shadows of some opaque gall-stones and thick-walled or calcified gall-bladders combined with cholecystography. Cholecystogram has many merits and possibilities in the demonstration of *cholecystitis*, of non-opaque *gall-stones*, the *obstruction of the cystic duct* and to give some indication of the power of the gall-bladder to concentrate and expel bile and of the liver to secrete it. The intravenous administration is more accurate, the oral administration more convenient and safer. This test should be avoided in patients suffering from heart disease, atheroma, abnormal blood-pressure, chronic jaundice, cholangitis, renal and hepatic insufficiency. With the aid of the opaque meal, radiography indicated pressure or traction of the distended or retracted gall-bladder upon the stomach, duodenum or colon with correct results in about 30 per cent of cases.

**OPERATIVE INDICATIONS** —According to Rowlands (*ibid.*), these are (1) Obstruction of the cystic duct or of the common bile duct, and (2) irritation and infection of the gall-bladder with symptoms such as

chronic pain and tenderness over the gall-bladder. The demonstration of gall-stones or cholecystitis is not sufficient indication unless symptoms are caused. Although in at least 5 per cent of cases of gall-stones, cancer later develops, he advises waiting for a quiet interval before operating. However, if symptoms increase, peritonitis develops or signs of acute pancreatitis appear, immediate operation is necessitated.

**TECHNIC.**—Thorough dissection of the cystic duct in its whole length is stressed by Lahey (New England J. Med. 201 522 (Sept. 12) 1929) to avoid injury to the common duct. The cystic artery is shorter than the cystic duct and may be torn when traction is made on the duct. Attempts to stop this hemorrhage may injure the hepatic duct. Ligation and division of the cystic artery before division of the duct avoids this and more easily demonstrates stone at the hepatico-cystic junction.

In 2 cases of stenosis of the common duct with massive adhesions, the duodenum was identified by Pool (Ann. Surg. 90 132 (1929)) but not dissected. A small transverse incision was made into it one inch distal to the pylorus. Through this a small aspirating needle was introduced and made to puncture the upper wall of the duodenum until blood, presumably from the portal vein, was obtained. The needle was then passed outward and upward until bile was obtained from the dilated duct above the stenosis, a grooved director and finally an artery clamp enlarged the opening. This communication was kept open by a small piece of catheter sutured into it, which 8 days later passed by rectum. A tube with en-

larged ends to maintain its position longer will be used in the future. Of the 2 cases reported one is in good condition 3 months after operation.

Rowlands' (*loc cit*) preparation for operation is **glucose and alkalies**, 2 or 3 days' rest in bed, **hexamine** and attention to nasal and oral foci. In the presence of *jaundice*, intravenous injection daily for 2 or 3 days of 5 cc (1¼ drams) of 10 per cent **calcium chloride**, or **blood transfusion**. Anesthetics of choice are **morphine** and **atropine** with **ether** and **oxygen**, or **twilight sleep** with local, or spinal anesthesia may be used. The Kocher incision for fat patients and the right paramedian incision for the less fat patients, to expose the lower part of the ducts, the pancreas and appendix, is the method of choice.

D Cheever (Arch Surg 18 1069 (Apr) 1929) determines the patency of the common bile duct by passage of a hollow instrument through the incision in the duct, into the duodenum and flushing with sterile **saline solution** which returns until the fenestra in hollow instrument passes through the ampulla of Vater. This will also float stones up to the incision where they can be removed.

He advocates duct **bougienage** with gradual **dilatation**, using No 10 to 20 silkweb olive tipped catheter, flushing with each. In 50 cases so treated out of 300, there was no duodenal reflux.

Charrier and Thalheimer (Arch mal de l'app digestif 19 541 (May) 1929) conclude that, aside from advanced fibrous stenosis, one may hope to conserve the choledochus and to obtain regression of the inflammatory process in *choledochitis* by temporary diversion of the bile. Early

intervention seems to prevent the stage of permanent stricture. Stenosis is treated in 3 ways: (1) external or temporary diversion of the bile, (2) internal diversion or permanent anastomosis between biliary tract and intestines, (3) direct plastic operation on choledochus (dilatation-reconstruction).

R P Rowlands (*loc cit*) believes that when the disease is limited to the gall-bladder and cystic duct, **cholecystectomy** is preferable. When the patient is very ill, old, or feeble, or when the mechanical difficulties attending removal are too great, or in the presence of chronic jaundice, infection, cholangitis, hepatic insufficiency, or chronic pancreatitis, then **cholecystostomy** is the better procedure. For obstruction of the common duct, which could not be removed, such as *carcinoma of the head of the pancreas*, or *bile duct* and for *chronic pancreatitis*, **cholecystogastrotomy** to conserve the bile is indicated.

#### POST-OPERATIVE RESULTS

—Recurrence of symptoms following operation is fairly common, according to E L Young, Jr (New England J Med 200 1145 (May 30) 1929). The cause is hepatitis or stones overlooked at operation. Of 67 deaths following biliary operation, additional stones were found at autopsy in 40 per cent or 27 cases. Of 41 cases in which stones were found at operation 58.5 per cent or 24 cases showed them also at autopsy. Stones were overlooked in 61.3 per cent at first operation. Many of these were justifiable oversights due to severity of the lesion or operative complications. The author concludes that in only 16.4 per cent or 11 of

these cases the overlooked stones should have been found.

G Cotte (Bull et mém Soc nat de chir 55 863 (June 22) 1929) stresses the value of injection of iodized oil and x-ray examination before removal of the drains from the gall-bladder and common duct. This occasionally reveals a calculus overlooked at operation.

R B Cattell and E. D Kiefer (J A M A 93 1270 (Oct 26) 1929) report 634 operations on the biliary tract from the Lahey Clinic. Of 65 cases of cholecystostomy, 28 per cent. were relieved. Of 548 cholecystectomies only 12 per cent were not satisfactorily relieved. These are divided into 2 groups (1) untoward effects of the operation such as incomplete removal of stones in 1 case, injury to the common duct in 1 case, post-operative hernia in 6 per cent, and operative mortality which was 5 per cent including all deaths over a period of 17 years. A subsequent series of 345 cholecystectomies showed 0.9 per cent mortality exclusive of malignancies. This lowered mortality rate is ascribed to better selection in cases, improved technic and preparation and, in the majority of cases, spinal anesthesia. Another factor is the avoidance of extra biliary operative procedures at the same time. A more routine choledochostomy in the second series in which 30 per cent were done, contrasted with 15 per cent of the previous series resulted in an increase to 12 per cent from 8 per cent of cases in which stones were found in the common duct. In this series there has been no case of stricture resulting in spite of this exploration, (2) the second group includes those patients with definite

gall-bladder disease plus gastro-intestinal symptoms due to peptic ulcer, achlorhydria, functional colon disorders, etc. It is important to make a thorough examination to determine previously such conditions. Their care must continue post-operatively, including an outline of hygiene on discharge from the hospital in all post-operative cases, with especial reference to an irritable colon and constipation.

A third group of unsatisfactory results were due to error in diagnosis. In 50 per cent of these, functional colon disorders were the sole cause of symptoms.

The highest incidence of unsatisfactory results appears to follow the removal of the non-calculous gall-bladder. Of 88 such cases, 63 per cent were relieved, as compared to 89 per cent in the group in which gall-stones were present, suggesting operation only if medical treatment does not relieve.

According to Rowlands (*loc cit*) in reports of Graham and his colleagues of the last 309 cholecystectomies for acute and chronic conditions with or without stones, there was a mortality of 2.8 per cent. In 11 cholecystostomies performed only in the cases which were the worst risks the mortality was 18 per cent. In the author's wards at Guy's Hospital, of 251 operations for gall-stones and cholecystitis there was a mortality of 2.8 per cent. In his private practice in 175 cases of all kinds of diseases of the gall-bladder and bile ducts there was a mortality of 6.3 per cent, 5 of these deaths occurred in the 25 cases in which choledochotomy was done. Of ultimate results cholecystostomy afforded complete and

permanent relief in only about 45 per cent. Persistence and recurrence was often due to leaving stones behind, to inflammation continuing deep in the walls of the gall-bladder or to the formation of new stones. Cholecystectomy afforded complete and permanent relief in about 86 per cent of cases. Persistence of symptoms in this group was often of a transient nature due to spasm of the sphincter of Oddi. Persistence of symptoms after operation might be due to residual infection in the liver or pancreas, to overlooked stones, to errors in diagnosis, to osteoarthritis of the spine, or to spastic or mucous colitis.

**GAS POISONING.**—The hazards of poisonous gases are not confined to war. Numerous fatalities occur from carbon monoxide in illuminating gas and in automobile gas. Such occurrences as the Cleveland Clinic disaster in which the gases were chiefly the oxides of nitrogen, and more recently the fatalities from methyl chloride escaping from automatic refrigerators, are not to be lightly dismissed.

**CARBON MONOXIDE POISONING**—In a recent survey undertaken to ascertain whether or not a health hazard from carbon monoxide existed in the streets of our large cities, inside of auto buses and in repair shops, J. J. Bloomfield and H. S. Isbell (Pub Health Rep 43 750 (Mar 30) 1928) made the following conclusions. Fourteen of the largest cities in the country were visited and 250 samples of air were obtained for carbon monoxide analysis. The street samples were taken where traffic was the most congested, hence, the results indicate the maximum hazard from automobile exhaust gas that may exist today in our metropolitan thoroughfares. The street samples showed a contamination of 0.8 part of carbon monoxide per 10,000 parts of air. Samples taken inside of auto buses yielded even lower concentrations of carbon monoxide gas. The figures for street air, when viewed in the light of present-day standards of exposure to carbon monoxide, do not reveal the ex-

istence of a health hazard from this source in our city streets. In the garages the average carbon monoxide content was found to be 2.1 parts in 10,000. In repair shops, therefore, a dangerous condition exists, which should receive the serious consideration of those concerned. Engines should not be allowed to run over 30 seconds unless the car is in necessary motion, or the exhaust is connected to the outside air by a direct airtight outlet of ample caliber.

J. A. Campbell (Brit J Exper Path 10 304 (Oct) 1929) has shown that in chronic carbon monoxide poisoning in animals the pathologic effect resembles closely those of prolonged exposure to low oxygen pressure in the inspired air. The main changes are venous congestion with atrophy of certain cells (*e g* liver, heart muscle near the epicardium), edema and dropsy, indicating that heart failure is the cause of inability to tolerate prolonged exposure to carbon monoxide. Haldeman's view that carbon monoxide acts purely by interfering with the oxygen supply to the tissues is supported.

**Treatment**—A study made by C. K. Drinker and T. J. Shaughnessy (J Indust Hyg 11 301 (Nov) 1929) on the use of carbon dioxide and oxygen in the treatment of carbon monoxide poisoning came to the conclusion that very satisfactory results were obtained by employing an initial inhalation of 7 per cent carbon dioxide and 93 per cent oxygen for from 5 to 20 minutes, and completing the treatment with the normal 5 per cent carbon dioxide mixture. Breathing is more active, consciousness returns more rapidly, and after effects have not been noteworthy.

**HYDROGEN SULPHIDE POISONING**—C. M. Aves (Texas State J Med 24 761 (Mar) 1929) states that in the development of the Texas oil industry, poison gas was encountered. The oil was found to contain hydrogen sulphide. All natural life has disappeared in the oil fields. There is a noticeable absence of birds and rabbits. It is not uncommon to find dead animals within the fire walls. The gas may produce marked effect on the eyes, with conjunctivitis or even an ulcerative condition of the cornea. In acute forms of poisoning, a complete paralysis of the central



nervous system may be found. No victims show sudden collapse. In a slightly less acute form, asphyxia with paralysis of respiration, in which the heart continues to beat, is found. Death usually results unless respiration is assisted. In still another type death occurs from pulmonary edema or broncho-pneumonia. In the chronic type of poisoning a state of nervous depression is occasionally seen, but is more of the type of shell-shock.

#### METHYL CHLORIDE POISONING

—A. H. Kegel, W. D. McNally and A. S. Pope (J. A. M. A. 93:353 (Aug. 3) 1929) describe the narcotic properties of methyl chloride from domestic refrigeration. The toxicity of methyl chloride is given as one-fourth that of chloroform. During the past year there have been reported in Chicago 29 cases of poisoning by commercial methyl chloride gas, resulting in 10 deaths. Poisoning produces drowsiness, mental confusion, coma, nausea, vomiting and, in severe cases, convulsions. The temperature, pulse and respiratory rate are all increased, and anemia usually occurs. The blood picture is suggestive of primary anemia. The blood-pressure is usually decreased. Nerve cells show progressive degeneration. All cases of methyl chloride poisoning reported in Chicago have occurred in kitchenette apartments using multiple unit refrigerator systems and where a leak was discovered in the apartment unit.

#### NITROGEN OXIDE POISONING —

In the Cleveland Clinic disastrous explosion "nitrous fumes" were involved. Nitrogen dioxide,  $\text{NO}_2$ , is a dense, reddish-brown gas. When nitric acid acts on organic material, nitric oxide is evolved which quickly takes up oxygen from the air, forming nitrogen dioxide or its polymer, nitrogen tetroxide. These fumes are the most insidious of all irritant gases. Anyone who inhales the fumes may be little inconvenienced. He goes home and eats his supper feeling perfectly well. During the night edema of the lungs develops, and before noon he is dead, drowned in the volume of fluid poured out in his lungs. The last statement was illustrated gruesomely in the cases at Cleveland (Editorial J. A. M. A. 93:460 (Aug. 10) 1929).

**GASTRIC FUNCTION TESTS.**  
—**MECHANISM OF GASTRIC SECRETION** —The outstanding contributions to this phase of gastric physiology have been made by Beaumont, Heidenhain, Pavlov, Edkins, Cannon, Carlson, and Ivy. Their work has established the mechanism of gastric secretion, which has been summarized by Ivy and his associates. The *first*, or cephalic phase of gastric secretion is only active for 30 to 45 minutes after ingestion of the meal. It is dependent upon reflexes through the cerebral cortex (psychic) and upon reflexes through the thalamus, midbrain and medulla, the different sensations being caused by the sight, smell and taste of food. This accounts for the so-called "*appetite juice*." The secretion may be absent in emotional states and extreme fatigue. The *second*, or gastric, phase of secretory activity may be initiated by 2 different types of stimuli. According to Ivy, the only mechanical stimulus which is active, is distention of the walls of the stomach. This probably accounts for the greater secretory output after ingestion of a large meal. Certain chemical substances like histamine and meat juices act via the gastric mucosa, causing an outpouring of gastric juice. The *third*, or intestinal, phase is dependent upon a humoral mechanism due to the elaboration of a hormone by the intestinal mucosa as a result of the entrance of food into the small bowel. This substance enters the circulation and stimulates gastric secretion. The humoral mechanism of the intestinal phase of gastric secretion was definitely proven by Ivy and his associates as a result of experiments with isolated stomach transplants. They

attribute the major secretory activity of the stomach to the intestinal humoral mechanism

**FUNCTIONS OF THE STOMACH.**—The gastric contents are brought to body temperature and reduced to a semifluid state suitable for intestinal digestion as a result of the motor and secretory activity of the stomach. Certain foods are chemically changed by the action of gastric juice. Native proteins are reduced to albumenoses and peptones, and caseinogen is converted to casein. By virtue of a relative motor inactivity during the first half hour after eating, the stomach encourages starch digestion by the amylolytic ferment ptyalin. A relationship exists between the function of the glandular apparatus of the stomach and the reaction of the blood even in the fasting state. G. Holler and I. Bloch (Wien klin Wchnschr 41 761 (May 31) 1928) found the hydrogen ion concentration of the blood increased beyond physiological limits in all but 15.4 per cent of hyperacid patients. The reaction of urine is likewise related to gastric secretion. Schulten (Munch med Wchnschr (May 18) 1928) concluded that if the urine is regularly alkaline after meals, hydrochloric acid is present in the stomach. Absence of such regular changes in the reaction of the urine is almost certain evidence of achlorhydria, according to this investigator. O. T. Davies (Brit J Exper Path 10 1 (Feb) 1929) found the reaction of the urine to be remarkably constant in true achylia and recommended a study of the reaction of the urine as a method of differentiating true and false achylia. The bactericidal action of gastric juice on the ingested food

is of considerable importance. The mucosa protects itself from irritating substances by the elaboration of mucus. Finally, the gastric mucosa at times takes on an excretory function, excreting certain poisons which are vomited. Its protective function is commonplace knowledge, ejecting certain poisonous substances, either chemical or foodstuffs, soon after their ingestion.

The interpretation of gastric function has been simplified by the work of Babkin and Loudon, who emphasize the rôle of the secretory and motor involuntary reflexes in the digestion of food and its evacuation from the stomach. Using unmixed ingesta, the quantity of gastric secretion and the time of digestion bear a definite relationship to the amount of food ingested. The amount of food and the evacuation time of the stomach are both proportional to the square root of the quantity of food taken. If the foodstuffs are mixed, each follows its own course of digestion. Various food mixtures which have been studied by M. E. Rehfuess (Diagnosis and Treatment of Diseases of the Stomach, 1927) modify both the secretion and evacuation time and consequently render the interpretation of function more difficult. It is for this reason that a simple food is invariably selected as a test substance for routine investigation. Ample clinical experience supports the contention that the secretory and motor function of the stomach can be satisfactorily estimated by the use of a simple test meal. A mixed meal prolongs the gastric digestive phase and consequently the time necessary for the test. It multiplies the technical difficulties of the examination

and makes the interpretation of results more complicated

**FRACTIONAL GASTRIC ANALYSIS OF REHFUSS**—This method, introduced in 1914, remains the method of choice for routine clinical study. It permits of (1) an extraction of the fasting residual juice for examination of the secretory and motor activity of the stomach and search for pathologic products, (2) the use of a simple test meal easily procured and leaving the stomach normally in 2 hours, (3) an estimation of gastric secretion throughout the period of gastric digestion, and (4) an estimation of the evacuation time or motor activity of the organ. Delayed digestion time is indicated by a fasting residuum containing more than 50 c c ( $1\frac{1}{2}$  ounces) of juice, microscopic or gross food and by obtaining over 30 c c (1 ounce) of juice or 10 c c ( $2\frac{1}{2}$  drams) of food sediment in the two-hour extraction

**HISTAMINE GASTRIC ANALYSIS**—The introduction of histamine as a strong gastric stimulant by Popielski added a new chapter to the study of gastric secretion. It has its greatest field of usefulness in the differentiation of true from false achylia. A profuse flow of gastric juice rich in hydrochloric acid and enzymes results from an injection of a small amount of histamine in all cases of subacidity. It provokes no response in cases of true achylia. No further increase in secretion occurs in cases of hyperacidity than will be obtained after the ordinary Ewald meal.

L. M. Gompertz and M. G. Voorhaus (Trans. Am. Gastro-Enterol. Ass., 1928) were the first to apply the test clinically in this country. They have found that 0.25 c c. (4 minims)

of a 1:1000 solution of histamine hydrochloride is sufficient to produce a reaction. H. L. Bockus and J. Bank (Arch. Int. Med. 39:508 (Apr.) 1927) use the drug in conjunction with the ordinary fractional analysis, injecting 0.25 or 0.5 c c (4 or 8 minims) of a 1:1000 solution at the completion of the ingestion of the meal. It is impossible to make a differentiation between true and false achylia by the ordinary fractional gastric analysis without the use of histamine. The single extraction method of gastric analysis, either with or without histamine, does not justify a diagnosis of true achylia. The fractional analysis with histamine is absolutely essential to the establishment of true achylia.

**NEUTRAL RED TEST FOR GASTRIC SECRETORY FUNCTION**—Several European observers have shown that neutral red, when injected intramuscularly, is secreted in the stomach exclusively by the acid-secreting cells. They noted that the appearance time of the dye in the stomach, following the injection of 4 c c (1 dram) of a 1 per cent solution, varied from 7 to 60 minutes, depending upon the degree of gastric acidity. It was not secreted by the stomach in achylia. Davidson estimated the secretion of the dye by the stomach quantitatively and reported its absence in cases of pernicious anemia. Piersol, Bockus and Bank injected 125 mg. (2 grains) of the dye in 5 c c ( $1\frac{1}{4}$  drams) of distilled water intravenously and recorded both the appearance time and the quantitative elimination of the dye by the stomach. They concurred with others in their failure to obtain dye in cases of true achylia with one notable ex-

ception Since the dye is secreted in the bile and small intestines, it may be regurgitated into the stomach even in true achylia Because of this uncontrollable source of error the neutral red test is inferior to histamine as a test for true achylia

**ESTIMATION OF CHLORIDES IN GASTRIC JUICE.**—Goodhart and Bolton do not consider the acid curve obtained by the fractional gastric analysis an actual index of gastric secretion They "made complete chloride estimations every quarter of an hour and found that as the acid curve went up the neutral chloride curve remained low, and as the percentage of acid fell that of neutral chloride increased *pari passu*, the total chloride curve remaining unaffected It was also found that in cases of diminished secretion the total chloride curve was low " They "concluded that the real secretory curve was not the acid curve, but followed that of the total chlorides, and that the acid curves represented the progress of the neutralization process only, which, in its turn, entirely depended upon relaxation of the pyloric sphincter at a certain stage of digestion permitting duodenal regurgitation " Boldyreff was the first to suggest the self-regulation of acidity of the stomach contents by regurgitation of alkaline intestinal fluids Spencer, Meyer, Rehfuß (*loc cit*) and Hawk "were able to demonstrate by a more delicate test for trypsin, evidence to prove that there is normally a regulation of acidity by the regurgitation of duodenal contents in the stomach We were able to demonstrate that the fall in acidity is usually accompanied by a rise in trypsin value " They noted an increase in

trypsin even when there was no evidence of bile regurgitation and concluded that duodenal regurgitation was the important regulator of gastric acidity The results of Goodhart and Bolton were confirmed by Baird, Campbell and Hern and by Roberts A very high incidence of duodenal regurgitation in normal subjects has been reported by Salmond (Bolton and Salmond *Lancet* 1 1230 (June 11) 1927) He found that 93 per cent of normal persons exhibited antiperistalsis of the duodenum The work of R Elman (*Arch Surg* 16 1256 (June) 1928) lends support to the views of Boldyreff, Rehfuß and Goodhart and Bolton He studied the effect of total drainage of the external secretion of the pancreas His experiments suggested a reciprocal relationship between alkaline pancreatic juice and the acid secretion of the stomach He found the total acidity of gastric juice higher during the drainage Acid solutions introduced into the stomach provoked a marked increase in the external flow of pancreatic juice The flow of pancreatic juice was always accompanied by the regurgitation of intestinal contents into the stomach

One cannot question the importance of duodenal regurgitation in the reduction of gastric acidity, but there are other possible mechanisms to be considered in this regulatory process Foster has shown that in the presence of pepsin gastric mucus neutralizes to a considerable degree gastric acidity Roth and Strauss, and Bennet and Crohn have demonstrated the ability of the gastric mucosa to secrete a diluting fluid The importance of these various factors in the regulation of gastric acid-

ity remains in doubt. Although Bolton contends that theoretically the gastric acidity is no criterion of gastric secretion, an estimation of the titratable acidity remains the examination of primary importance in clinical investigation. The ease of computation of acidity recommends it to the clinician. If the acidity is studied in connection with presence or absence of bile regurgitation, as it should be routinely, the estimation of chlorides is not necessary in routine work. A climbing type of acidity without evidence of bile establishes the presence of Bolton's so-called hypertensive pylorus or failure of the pylorus to relax. Chloride determinations are not necessary. In suspected cases of achylia, the examination for free acid and enzymes after histamine injection will establish the diagnosis.

**GASTRIC ANALYSES WITH FLUID TEST MEALS**—Test meal solutions to which an indicator is added are being used in certain European clinics. The advocates of this method of analysis claim greater accuracy in the determination of the volume and acidity of gastric juice than can be obtained by the food meals commonly used. G. Katsch (*Handb. d. norm. u. path. Physiol.* 3: 1118, 1927) employs as a test solution 2 drops of 2 per cent methylene blue in 300 c.c. (10 ounces) of water containing 0.2 Gm. (3 grains) of caffeine. After introducing the tube he makes extractions from the stomach every 10 minutes in order to establish the fasting HCl, total acidity, total chlorides and pepsin. The test solution is introduced through the tube and samples are withdrawn every 10 minutes. The color is compared with

that of the test solution and acid, chloride, and pepsin determinations are carried out.

Alcohol has been similarly used as a test solution by Ehrmann, Lantz, Bloomfield and Keefer (*J. A. M. A.* 88: 707 (Mar. 5) 1927) and Cheney (*Am. J. M. Sc.* 177: 110 (Jan.) 1929). The method employed by Bloomfield and Keefer follows. Under basal conditions metabolically, the fasting juice is aspirated through a duodenal tube until the stomach is empty. A test-meal solution of 50 c.c. ( $1\frac{2}{3}$  ounces) of 7 per cent alcohol and 0.5 c.c. (8 minims) of 1 per cent phenolphthalein is introduced through the tube. Immediately after the introduction of the meal the stomach contents are withdrawn, measured, and reinjected, retaining 10 c.c. ( $2\frac{1}{2}$  drams) for analysis. This procedure is repeated at 10 minute intervals until the stomach is empty or for 1 hour when the test is terminated by emptying the entire gastric contents. The individual fractions are examined for acidity by titration, hydrogen ion concentration (micro method of Brown) and volume of gastric juice secreted.

Cheney has simplified the method of Lantz and Bloomfield and Keefer. His meal consists of 50 c.c. ( $1\frac{2}{3}$  ounces) of 7 per cent alcohol containing 1 c.c. (16 minims) of a 0.1 per cent solution of phenolphthalein in 95 per cent alcohol. A Jutte tube is passed and the fasting contents removed. The meal, warmed to body temperature, is injected through the tube. After 20 minutes, 10 to 15 c.c. ( $2\frac{1}{2}$  to  $3\frac{3}{4}$  drams) are withdrawn. The stomach is emptied at the end of 40 minutes. The specimen is tested for hydrochloric acid at once, if absent the tube is not removed, but

0.1 mg ( $\frac{1}{10,000}$  grain) of a 1:1000 solution of histamine per kilo ( $2\frac{1}{2}$  pounds) of body weight is injected subcutaneously. Specimens are removed until free acid appears or 3 specimens have been found negative for free acid. The fasting contents are examined in the usual manner. The percentage of phenolphthalein in the post-meal fractions is determined by a simple method. In this way, the amount of dilution of the gastric secretion can be calculated. Cheney mentions the following advantages of this method: (1) Salivation from eating the meal is prevented. (2) Extractions are more easily made as there are no food particles to block the tube. (3) Filtering the gastric juice is rarely necessary. (4) There is no neutralization of the acidity by the meal. (5) Alcohol is a reliable and rapidly effective stimulus to gastric secretion. (6) The presence of the indicator makes possible a determination of the volume and acidity of pure gastric juice and also the rate of stomach emptying. (7) The use of histamine as suggested saves doing a subsequent analysis in cases of achlorhydria. The unavoidable sources of error by this method, according to Cheney, are: (1) It is not possible to estimate the amount of alkaline mucus secreted by the gastric mucosa. This is also true of other methods. (2) Precautions must be taken against the swallowing of saliva with this test as with others. (3) No importance can be attached to free acid value in cases with active bleeding. (4) The regurgitation of alkaline duodenal fluid was the chief source of difficulty. This was noted in 10 per cent of cases. The pres-

ence of bile renders the phthalein readings of little value.

The writer is somewhat skeptical of the claims of superiority of this method over the older test meals. It is true that the gastric secretory response to alcohol or any other fluid meal can be more accurately determined than the response to a food meal which neutralizes some of the acid. J. G. Espin (*Arch. españ. de enf. del ap. digestiv.* 11:84 (Feb.) 1928) recently reported a series of cases in which lower acid values were obtained with alcohol than with the Ewald meal. The neutralization of acid by the Ewald meal is of little practical importance and is fairly constant. The admixture of saliva with the test meal is not undesirable, since it more nearly reproduces the condition in the stomach following the normal ingestion of food. The injection of a fluid meal directly into the stomach, however, eliminates the cephalic phase of the gastric secretory mechanism. The criticism directed against the Ewald meal, because of the difficulty in making extractions due to food clogging the tube, is more theoretical than real. Little difficulty will be experienced if proper tubing is used except in cases of achylia. The tube does not have to be removed after the extraction of the residuum if soft bread or gruel is used. These foodstuffs can be readily swallowed with the tube *in situ*.

There is some reason to doubt the efficacy of alcohol as a test substance. Carlson found that alcohol inhibits gastric tonus and peristalsis, contrary to previous opinion. If an abnormal state of gastric tonus is induced, the secretory response may be likewise modified. A very serious practical

objection to alcohol as a test solution is the difficulty of obtaining and keeping on hand a sufficient quantity for use in a busy clinic. The principal disadvantage of the fluid meal is its inferiority as a test load for gauging the motor function and more particularly the emptying time. From a clinical standpoint, information concerning the evacuation time of the stomach is of paramount importance. It seems very doubtful that alcohol or any other test solution will supplant a food meal for routine clinical work. However, test solutions with an indicator will be used undoubtedly as an adjunct to the ordinary test meal in cases in which additional accurate data are desired concerning the acidity and volume of gastric secretion.

#### EFFECT OF SYMPATHETIC NERVES ON GASTRIC ACIDITY.

—H. Moll and E. R. Flint (Brit J Surg 16:283 (Oct) 1928) emphasize the importance of the depressing influence of the sympathetic system on the secretion of hydrochloric acid. Their work is summarized below. Both achlorhydria and hyperchlorhydria have been reported in Graves's disease by various investigators. These writers found a constant tendency toward hypochlorhydria, achlorhydria being more frequent in long-standing cases. The tendency to achlorhydria in chronic cases is attributed to persistent stimulation of the sympathetic system by the thyroid toxin. Duodenal regurgitation may be a factor since it is present in 60 per cent of cases of achlorhydria of Graves's disease (Rehfuss). The feeding of thyroid to animals had a varying effect on gastric acidity, confirming the results of others in this respect. Atten-

tion is drawn to the inhibiting effect of adrenalin on the motor and secretory function of the stomach, stressing the sympathetic nervous system factor in the producing of hypochlorhydria.

The opposite effect was produced with nicotine, which caused a hyperchlorhydria by paralyzing the sympathetics. There is sufficient evidence to suggest that certain unpleasant emotions inhibit both secretion and motility. Further proof is added to support the existence of inhibitor nerves in the sympathetic system going to the stomach by inducing an experimental hyperchlorhydria after bilateral division of the major splanchnic nerves. It is felt that there is sufficient proof to support the production of hyperacidity or achylia by extragastric diseases acting through the sympathetic system.

A. Fragomele (Morgagni 69:1721 (Oct 30) 1927) as a result of experiments on Pavlov pouch dogs, reports a decided inhibitory action on gastric secretion following the injection of the active principle of the suprarenals, thyroid and hypophysis. He feels that this may explain the dyspepsia which so frequently accompanies affections of the endocrine glands.

Kellerman noted a decrease in free acidity and an inhibition of duodenal regurgitation after atropine whether the stomach was in the resting or digestive phase. In severe pathologic changes in the stomach paradoxical reactions are sometimes noted, but an increased secretion is never produced.

**GERMICIDES.** —That *a-brom* soaps are more germicidal than the unsubstituted soaps is the opinion of A. T. Eggerth (Jour Exp Med 49.

53 (Jan ) 1929), the only exception being *B. typhosus*. In the series studied, **brominated soaps** of 12 and 14 carbon atoms were most germicidal for the Gram-negative organisms, while soaps of 16 and 18 were most germicidal for Gram-positive. These soaps are more active in acid than in neutral or alkaline reactions.

The same author (J. Exp. Med. 50:299 (Sept.) 1929) finds that *α-hydroxy soaps* exhibit a high germicidal action toward certain organisms. The action increases with molecular weight to a certain maximum and then diminishes. The pH affects the action as it does other soaps. In saturated soaps, the hydroxyl group increases selective germicidal action, whereas in the unsaturated soap it diminishes it.

That it is impossible to produce a germicidal soap by the incorporation of small quantities of phenol is shown by B. Harpil (J. Bact. 16:287 (Nov.) 1928). The addition of large quantities is not feasible because of the cost of production.

### GLANDULAR COMPOUNDS

—Of promise is the announcement of the extraction from the suprarenal cortex of a principle or principles which prolong the life of supra-renalectomized animals. As yet the substance isolated has no clinical application. *Epinephrine*, the active principle of adrenal medulla, has been found to have a contractile effect on the spleen with concomitant increase in red cells in the circulation for a short time. This compound by virtue of its powerful accelerator stimulation can cause cardiac arrhythmia of unpleasant and dangerous nature. It should be cautiously exhibited ac-

cording to Otto (J. Lab. and Clin. Med., 13:70 (Oct.) 1927). Evans and Simpson (J. A. M. A. 91:1337 (Nov. 3) 1928) have demonstrated that the *anterior lobe of the hypophysis* elaborates a hormone stimulative of growth. In addition, evidence has been obtained indicating the presence of a gonad-specific acting hormone. Thus the anterior pituitary contains both growth and sex hormones. The clinical value is not yet established. In the case of thyroid, synthetic *thyronin* has been found efficacious even when given orally and can be ingested for long periods without danger so long as small doses are used. A variety of *ovarian glandular compounds* are appearing on the scene. The follicular products are quite evidently oestrus producing agents and are of therapeutic value. A concentrated *liver extract* for treatment of **pernicious anemia** is now available in stable, standardized form. The progress in the identification, isolation, and use of glandular compounds is most encouraging.

**GLAUCOMA —GENERAL CONSIDERATIONS** —Otis Wolfe (Eye, Ear, Nose and Throat Monthly 8:109 (Apr.) 1929), in discussing what the refractionist should know about glaucoma, says that the disease has been classified as acute and chronic, but he prefers the terms congestive and non-congestive. He concludes that it is necessary that the one who refracts be familiar with the symptoms of glaucoma. This is especially true of the non-inflammatory type. Even the specialist must be observant in his diagnosis of incipient cases. If his examinations are thorough, he should encounter no difficulty. He



should even find and remedy many pre-glaucomatous conditions

The National Society for the Prevention of Blindness has instituted an active campaign on glaucoma as a cause of blindness. An interesting booklet has been published by this Society which should be in the hands of the refractionist so that it may, in turn, be commended to his patients.

F P Calhoun (J M A Georgia 18 308 (July 13) 1929) emphasizes that from one-fourth to one-third of all blindness after 45 is due to glaucoma. Unless glaucoma is recognized and unless immediate medical or operative treatment is given, sight is hopelessly lost. In 64 cases studied by the writer, vascular disease was present in 95 per cent of these latter, syphilis was present in 15 per cent, nephritis in 40 per cent and in 37 per cent of all 64 cases, an abnormally high diastolic pressure was present in 57 per cent, an abnormally high systolic pressure was present in 42 per cent and a dilatation of the heart or aorta was found in 60 per cent. He urges the general practitioner who frequently first sees glaucoma to listen to the patient's complaints, to observe the eye and to detect the changes incident to glaucoma and to estimate the tension of the eye. The adoption of this rule would save the sight of many.

**ETIOLOGY**—F T Tooke (Am J Ophth 11 97 (Feb) 1928) reports some features of glaucoma complicating iridocyclitis. He believes that glaucoma is a symptom secondary to some other systemic or ocular condition. He reports 5 cases in which it was clearly secondary. Photomicrographs showed deposits of pigment

and other secondary changes in the drainage angle.

In a case reported by E L Goar (Am J Ophth 10 906 (Dec) 1927), glaucoma developed 82 days after thrombosis. Medical treatment was tried, but was unsuccessful. A month after the onset of the condition, the eye was enucleated. At that time the blood-pressure was high, the blood showed chloride retention, and a peripheral abscess of 1 tooth was found. The tooth was removed. When the patient was placed on a salt-free diet, the arterial hypertension and hemorrhages ceased. In a pathological report on the enucleated eye, the essential changes were found in the media and intima of both arteries and veins in the retina. The choroidal vessels were markedly thickened and congested.

P C Kronfeld (Am J Ophth 12: 480 (June) 1929) states that the vast amount of work that is being done with regard to glaucoma has raised many questions, and that the solution of the problem of the mechanism of this condition is still as distant as ever. He regards the three following tests as important: (1) the dark-light test, (2) the determination of the tension after evacuation of the anterior chamber and (3) the determination of the tension with a 10 or 15 Gm weight on the cornea.

The etiology of glaucoma is the subject of a paper by W S Duke-Elder (Brit M J 2 236 (Aug 11) 1928) who says the first matter to be settled in the problem of intra-ocular pressure is the nature of the processes controlling the formation of the aqueous. The aqueous is not a secretion nor, under normal circumstances, a transudate. It is a dialysate of the

capillary blood formed by the same processes as the other tissue fluids. The aqueous in all conditions is in complete thermodynamical equilibrium with the plasma—chemically, osmotically, electrically, and hydrostatically. Its formation is a physicochemical process.

The second fundamental determination to be made in the study of intra-ocular pressure is the nature of the circulation of the aqueous humor. Three factors entering into this are (1) a continuous metabolic interchange between the aqueous humor and the blood through the capillary walls, (2) internal thermal circulation caused by convection currents in the anterior chamber, and most important, a through-and-through pressure circulation, and (3) the changes in the volume of the contents of the globe which occur in the vitreous.

The vitreous is a gel bathed in aqueous. The main determinant of its volume is the degree of hydration of its colloid particles.

If glaucoma is considered merely as a pressure symptom, the 2 main factors in its etiology are (1) a derangement of the capillary circulation involving a capillary dilatation, which produces a rise in capillary pressure, or increased permeability of the capillary walls, which allows an excess of colloids in the fluids of the eye, (2) changes of a physicochemical nature in the vitreous. These 2 factors act either alone or together, and their efficiency in causing a permanent rise of pressure depends directly upon the efficiency of the drainage channels in the region of the angle of the iris.

**DIAGNOSIS**—H. V. Wurdemann (Am J Ophth 10 831 (Nov) 1927)

has studied the relation of cupping of the optic disc to the visual fields in glaucoma. The weak spot of the globe is the foramen in the sclera and choroid, and it is here in the nerve where signs of increased pressure appear. These signs vary according to the suddenness, severity, and periodicity or permanency of the pressure. Cupping of the disc is due to stretching of the lamina and atrophy of the nerve bundles in the distal end of the optic nerve. The temporal retina suffers first and most, the temporal capillary branches being more affected because of their length, but the main defects in the visual field are the results of atrophy of the nerve fibers going to that particular field. However, the field defects vary in each case, according to which fibers are most involved, as is evident from the Ronne, Seidel, Bjerrum and Elliott signs. The order of development of field defects is (1) concentric contraction, (2) nasal sectoral deficiency, (3) enlargement of the blind spot and isolated pericentral scotomata, and (4) involvement of the papillomacular fibers with loss of central vision and blindness.

The color fields in glaucoma are relatively as large as those for white and form a diagnostic point of some importance, since in other atrophic types the color fields are generally more affected than those for form.

**Pseudoglaucoma**—A. Fuchs (Brit J Ophth 12 65 (Feb) 1928) discusses 7 cases of pseudoglaucoma. The first patient had a congenital pit in the optic disc coexisting with a glaucomatous excavation of 4 diopters. The upper half of the visual field was lacking, central vision with glasses was 6/12, tension was 22 mm Hg.

(Schiotz) before and after the administration of homatropine and after dark adaptation

In the second case, a coloboma of the nerve head produced an appearance of glaucoma, but the following contraindications to this condition were present a semi-opaque tissue (neuroglia) filling the excavation, tension of 20 mm Hg, enlargement of papilla, a horizontally oval blind spot, and the fact that in a year there had been no change

The third case was somewhat similar to the second. Enlargement of the papilla was questionable. Surrounding the papilla was a halo more than 1 diopter depressed from the level of the retina and irregularly outlined with pigment. The field and tension were normal. A sister of this 12-year-old patient had an inferior conus

In each of the 4 other cases, angiectasis of the eyeball was present and resembled the congestive type of glaucoma in that the dilated conjunctival and ciliary veins produced an appearance of caput medusæ. In 1 of these patients there also existed a region of angiectasis in the nasolabial fold

**TREATMENT** — *Non-operative* — S R Gifford (Arch Ophth 57 612, 1928) discusses the effects of **adrenalin** and its derivatives, derivatives of **ergot**, **hypertonic solutions**, **calcium** and **barium salts**, and **pituitrin** in the treatment of glaucoma. He states that the meagerness of clinical reports on the use of these drugs prevents definite judgment as to their value, but all of them have interesting possibilities

The importance of **light** and **heat** in the treatment of glaucoma, particu-

larly that associated with acute congestive conditions, is emphasized by F P Lewis (J A M A 89 2022 (Dec 10) 1927). In combination with the dry radiant heat of an electric bulb, he uses a **glycerin solution** and frequently **foreign protein** and **dionin**

He has found that such treatment results in the relief of pain and a moderate reduction in the tension

The conservative treatment of glaucoma is outlined by R Thiel (Therap d Gegenw 70 71 (Feb) 1929) who believes that in spite of the numerous claims for recently introduced therapeutic agents **pilocarpine** and **eserine** (**physostigmine**) are still the best drugs for glaucoma. A 1 to 2 per cent solution of pilocarpine and 0.25 to 0.50 per cent solution of the eserine is used. These drugs can be used without danger or change in the therapeutic efficiency for years. The usefulness of **adrenalin** is rather limited. In acute iritis with increased pressure and in glaucoma simplex it may be beneficial. It is not recommended in hemorrhagic glaucoma. **Histamine** is a more efficient myotic than pilocarpine or eserine (**physostigmine**). Among the substances which may act indirectly **ergotamine**, **bromides**, **calcium**, **hypertonic salt** and **glucose solution** may be of value. The secret of success is the individual treatment of the patient

G E Clay and E R Vernon (J M A Georgia 18 306 (July) 1929) report that **glucosan** has been recently brought forward in Germany, by Hamburger, who cites cures of glaucoma with it, but this has not been the experience of those reporting its results in America. It is a 2 per cent levorotatory adrenalin com-

pound In using it, the patient should be lying down, the eye first anesthetized with **butyn** or **holocaine** and 5 drops instilled into the eyes 15 minutes apart, after which **eserine** should be instilled The patient should be closely observed for about 2 hours after its use, since there have been a few reports of sudden rise in tension In the experience of the writers, every case has had a marked lowering of tension following its use, and they believe it is the most effective drug in the treatment of glaucoma

The osmotic pressure of the blood can be readily increased by the intravenous injection of **crystalloidal** or **colloidal solutions** in the proper concentration, and the effect of such a procedure on the pressure of the cerebrospinal fluid and the aqueous humour has been known for a number of years A lowering of intraocular pressure can always be produced by this method, and R K Lambert and S Silbert (J A M A 90 1435 (May 5) 1928) have reported the effect of intravenous injections of **hypertonic solutions** on ocular tension in normal subjects R K Lambert and I Wolff (Arch Ophth 2 198 (Aug) 1929) now record the results of such injections in a small series of 9 cases of glaucoma From 200 to 300 c c (6½ to 10 ounces) of a 5 per cent solution of **sodium chloride** was injected intravenously, by gravity, through a small-bore needle, the use of a small needle automatically controls the speed of injection The total dose of sodium chloride was thus 15 Gm (½ ounce) or less, which, in the absence of any contra-indication such as nephritis, is said to be entirely non-toxic Weight-for-weight dextrose is reported as being much less effective than sodium

chloride, a 5 per cent solution of dextrose is isotonic to blood as compared to 0.85 per cent of sodium chloride The ideal solution would be a colloidal one, since it would have less tendency to permeate the capillary walls In each of the cases there was a definite drop in tension varying from 7 to 17 mm of mercury The authors admit that the factors controlling the amount of drop cannot be determined from so few cases, but they think it is suggestive that the greatest drop occurred in 2 cases of acute glaucoma which had the highest initial tension of the series

In reporting on the acute rise of tension following the use of **adrenalin** in glaucoma, S R Gifford (Am J Ophth 11 628 (Aug) 1928) states that it is generally known that **adrenalin**, while having no effect on the pupil or tension when dropped into the normal eye, produces dilatation of the pupil with a marked decrease in intra-ocular tension when it is injected beneath the conjunctiva He soaks a small cotton pledget in **adrenalin** and places it in the upper *cul-de-sac* This is as effective as injections The eye is first given 2 instillations of 2 per cent **butyn** A decrease in the tension is usually noted within 1 or 2 hours, and after 24 hours the tension is often between 10 and 12 mm (Schiotz) It then gradually rises to about normal within the next day and often returns to its previous level above normal within a few days In a fair number of cases it may be kept normal for a much longer period by the use of **eserine** which previously was not effective He draws the following conclusions

1. In chronic simple glaucoma, **adrenalin** (or **glaucozan**) is of definite

value as an adjuvant to other remedies. It is dangerous in inflamed eyes and eyes with damaged vessels. Hence it is contraindicated in acute glaucoma, in inflammatory and hemorrhagic glaucoma, and in absolute glaucoma.

2 It is contraindicated also in glaucomatous iritis.

3 The danger of provoking acute glaucoma is due to the mydriasis.

4 There is more danger of provoking such attacks even in simple glaucoma than previous reports indicated.

5 Mydriasis should be prevented or decreased by the free use of miotics before and after adrenalin treatment.

Recently, disturbances of the internal secretions have been frequently drawn into question for the explanation of the genesis of glaucoma, according to H. Schmelzer (Arch f Ophth 120 14, 800, 1928). On the whole, it appears to be settled that in hyperfunction of definite endocrine glands frequently a hypotonia of the eyes is to be determined clinically. Proceeding from the observations of a hypotonia of the eyes in the great majority of disease pictures, which may be attributed to a hyperfunction of an individual endocrine gland (thyroid, ovary, pituitary), various authors believed that a hypofunction of the endocrine glands concerned must be assumed as the cause of the glaucomatous rise in pressure, and for this reason administered corresponding organ preparations in glaucoma patients. Hertel and Freytag were content with the results of this glaucoma therapy. They frequently observed a decrease in ocular pressure following administration of **thyroid**. Imre frequently observed striking

fall in pressure in glaucoma following administration of **pituitary** tablets or injection of **testicular** or **ovarian extracts**. Wessely, on the contrary, could not be convinced of the remarkable influence of thyroid medication.

The manner of action of the various glandular preparations is explained in the following way by individual investigators. Hertel believes it to be an acceleration of the osmotic processes and a stimulating action on cellular activity by means of the **thyroid** hormone. Imre explains the permanent effect of the adrenal hormone, **adrenalin**, by its influence on the physico-chemical state of the cells. Even if the investigations of various authors (Asher, Seidel, Serr) can still give no complete explanation for the manner of action of the individual organ preparations, particularly of **thyroid** on the ocular pressure, still they permit the following conclusions to be drawn. In therapeutic experiments, to bring about a prolonged fall in pressure in the glaucomatous eye with organ preparations can only be a question of a definite action on the secretion organ, namely, on the ciliary epithelium.

Sealinci distinguishes between acute and chronic glaucoma. Whereas in *acute* glaucoma, which one encounters most frequently, characteristically in young women, hormonal influences play a rôle in the first place, in *chronic* glaucoma, it is a question of toxic influences. It is apparent that in any form of glaucomatous rise in pressure, **adrenalin** is capable of lowering the pressure and accordingly can be effective in cases where it is a question of obstruction of the vascular pores and myotics fail. Several times, however, following local ap-

plication of adrenalin, a further rise of the already heightened ocular pressure was observed

W S Duke-Elder and F W Law (Brit M J 1 590 (Mar 30) 1929), in their report of 15 cases of glaucoma treated by **adrenalin** and **histamine**, conclude that so far as can be observed neither of the 2 drugs has any prolonged effect in lowering the intraocular tension. Their action would seem to be temporary and adjuvant to other treatment, postponing, perhaps, but not without any special reason replacing operation. The action of the drugs is neither uniform nor dramatic

*Operative*—In a review of the relative value of glaucoma operations, L C Peter (Optometric Weekly 20 191 (Apr 4) 1929) summarizes his results as follows

**Sclero-corneal trephining** is given the premier place in the operations for glaucoma. It is applicable to a large number of patients and is the operation of choice in the greatest number of cases. Its results are most enduring

**Iridectomy** is of value in acute glaucoma, and in immature cataract when complicated by secondary glaucoma

**Cyclodialysis** has a limited, but definite, application. It fills a gap in a fair number of cases in which other methods are likely to fail. They are the cases of glaucoma secondary to a swelling lens and after lens extraction, whether the glaucoma is primary or secondary. It also is of limited value in advanced cases when vision and the visual fields are reduced to a minimum. It should also be tried when the conjunctiva is too thin to admit of a good flap. It is not

a routine type of operation, but one for selected cases and not too reassuring as to results

**Anterior sclerectomy** is of much value, but it is attended by dangers not encountered in trephining. As Wilmer believes, it should be practiced, if at all, upon eyes of moderate tension

**Iris inclusion** should be held *sub judice*. It will require a more general approval before it can rank with other procedures in efficiency

**Posterior sclerotomy** is to be recommended as a valuable measure in temporarily preserving vision and paving the way for an operation of more permanent results

**Paracentesis of the anterior chamber**, like **posterior sclerotomy**, is a preliminary measure of great value. Its indications differ from the latter, but in accomplishing results, the 2 measures take equal rank

In a preliminary report of an operative procedure for glaucoma Elliott Norton (Am J Surg 6 752 (June) 1929) describes an **iridosclerectomy**. The first part of the operation is an iridectomy with dissection of the iritic root after the manner described by Torok. The second part of the operation consists of a sclerectomy by means of a slightly modified Vacher-Stephenson scleral punch

**BUPHTHALMOS — TREATMENT**—*Infantile glaucoma* is particularly difficult to treat owing to the fact that the eye of the child is enlarged by the increased intraocular pressure. P Veil (J des Praticiens (June 15) 1929) points out that parents bring these children to the ophthalmologist after the eye has become hardened and increased in size. The cornea also has usually

undergone secondary degenerative changes. If the cornea is not affected the nerve will usually appear excavated in a manner similar to the excavation observed in adults affected with chronic simple glaucoma. The evolution of infantile glaucoma is slow and progressive and in most cases results in total blindness. Treatment with myotics is indicated, and frequently anti-syphilitic treatment is advantageous since many of these cases are encountered in hereditary syphilis. If hypertension persists Veil prefers iridosclerectomy by the La Grange or the Elliott method. Some of his patients treated by the method outlined have retained their vision.

**GLUTATHIONE.**—This compound, discovered by Hopkins, was originally taken to be a dipeptide, but has recently been found to be a tripeptide consisting of cysteine, glutamic acid, and glycocoll. So far, its significance in physiological economy seems to be related to its activity as a hydrogen carrier in the oxidation-reduction process of the body. It is present in the blood in amounts sufficient to affect the blood sugar determination. It is found in highest concentrations in the *Zona reticularis* of the adrenal cortex, but the liver also contains significant quantities. After pancreatectomy this decreases. Asphyxia increases the content of the blood in reduced glutathione, hyperventilation has but a slight effect. This is consistent with the finding that poisoning of the rabbit with potassium cyanide increases the glutathione content of liver perfusate. Histological studies of keratin formation indicate that the development is

preceded by an accumulation of the sulfur compound, which disappears with the appearance of the horny compound. In acid systems, glutathione promotes the oxidation of fatty acids and lecithin but not of proteins.

It appears that the glutathione system plays an important rôle in the chemical defense mechanisms of the body against such specific poisons as arsenic, cyanide, methylene blue, and certain heavy metals as copper and gold. It certainly influences intracellular respiration. Apparently the mitochondria are the bearers of the compound. L. E. Baker (*J. Exper. Med.* 49: 163 (Feb.) 1929) has shown that growth of tissue cultures is accelerated by glutathione. This, taken with the work of F. S. Hammett (*Protoplasma*, 1928-1929), on sulfhydryl, indicates the possibility that the compound is concerned with the regulation of cell division, but as yet its function remains to be determined. Its importance, however, is unquestionable.

**GLYCOSURIA.**—That not every glycosuria means diabetes mellitus is now well recognized, but from time to time new and curious cases are reported of glycosuria occurring in connection with various conditions. W. B. Meyer (*Med. Welt* 3: 637 (May 4) 1929), in summing up the diagnostic points differentiating glycosuria due to true diabetes mellitus from that associated with other conditions, says that in diabetes it is dependent on the amount of carbohydrates ingested, there is a definite limit of tolerance, it is influenced by insulin, there is a hyperglycemia and a characteristic blood sugar curve on

the ingestion of a definite amount of sugar. The experimental glycosuria of animals caused by stimulation of the floor of the fourth ventricle is imitated to a certain extent in man by organic cerebral disturbances such as trauma, tumor, hemorrhage, toxemias from fevers, strychnine and other drugs, but it has no relation to carbohydrate intake. *Endocrine glycosurias* from hyperthyroidism, acromegaly, etc., require no dietetic treatment and insulin has no effect on the cause. The *renal glycosurias* are still obscure but the general metabolism is unaltered, the changes are in the kidneys.

The so-called *glycosuria innocens* is important diagnostically, and often accidentally discovered in routine examination. It occurs at all ages, has no symptoms, is practically independent of carbohydrate intake, does not respond to insulin, the blood sugar is usually normal, the curve rises and falls sharply. It is probably a developmental defect. H. Rau reports a case of this kind (Deutsche med. Wchnsch. 55:1338 (Aug. 9) 1929) in a girl 7 years old whose uncle probably had the same condition. In H. M. Bowcock's (Ann. Int. Med. 2:923 (Mar. 29) 1929) study, 18 members (58 per cent) of a family excreted a reducing substance in the urine. Glycosuria was first found at 22 months in the youngest and at 78 years in the oldest member. The condition was present in 4 generations. Complete study of 5 members showed mild diabetes mellitus in 1, cyclic renal glycosuria in 2 and renal glycosuria in 2 cases.

To gain an idea of the frequency of *non-diabetic glycosuria*, the figures of H. J. Ustedt (Norsk mag. laegevi-

densk 90:941 (Sept. 29) 1929) may be consulted. In 10,000 patients without diagnosed diabetes, 1.6 per cent had glycosuria. Of 62 patients with accidentally discovered chronic glycosuria, 55 were true diabetics. Of 32 cases of transitory glycosuria, 14 had some form of cerebral disease. In 206 cases of persistent glycosuria including diabetes mellitus, 5 had cyclic hyperglycemia, 2 had renal glycosuria for 9 and 10 years, respectively. The mother and sister of 1 of these latter patients also had renal glycosuria, and 2 other children of the family had transitory glycosuria.

The association of chronic pancreatitis and infections of the gall-bladder are well known. Removal of the gall-bladder often ameliorates or even cures mild diabetes due to this cause, as exemplified in a case reported by C. D. Shapland (Lancet 1:758 (Apr. 9) 1927).

Further reports appear of the influence of sepsis from sore throats, sinusitis, cystitis, etc. It not only aggravates already existing diabetes, but causes glycosuria to appear in some individuals whose urine was previously sugar-free.

**GOITER** —P. Stocks, A. V. Stocks and M. N. Karn (Biometrika 19:292 (Dec.) 1927) in an anthropometrical study of goiter in adolescence, finds that the measurement of its maximum breadth is the most reliable size index. The peak incidence is 13 to 14 years of age in boys, and 17 to 18 in girls. When goiter is not endemic the goiter curve of the gland flattens out with but little changes between the ages of 10.5 and 13.5 years. A rapid development of the thyroid



occurs in girls between 13.5 and 15 years

**PATHOLOGY**—The controversy between "*toxic goiter*" and "*hyperthyreosis*" is still raging, with the honors about even. Such being the case we will here report only some of the newer findings in the field.

When patients have exophthalmus superimposed on hyperactivity there is found frequently a relative lymphocytosis. This may be due to stimulation of the sympathetic nervous system. The condition is more often than not dissipated by thyroidectomy. Liver function is also enhanced in goiter. This correlation is attributed to neural stimuli through the vagus and sympathetic system. This interpretation of neural etiology in *hyperthyroidism* has been carried to the extent of **resecting the right upper cervical and left stellate ganglia**, with 2 alleged cures.

H. F. Dunlap and A. B. Moore (M. Clin. North America 12:1511 (May) 1929) have made x-ray studies of bones in hyperthyroidism. They show that in long standing conditions osteoporosis is found in all parts of the skeletal system. When moderate or slight in degree it is most readily discerned in the spongy bones and those with superficial coverings, such as the skull, etc. It is most apparent in the epiphysis in the long bones. Care in differentiation of etiology must always be made.

**COMPLICATIONS**—W. O. Johnson (J. Nerv. and Ment. Dis. 67:558 (June) 1928) has reviewed the incidence of *psychosis* in 2286 cases of operation for hyperthyroidism. In only 24 cases were the 2 associated. It is concluded that an already present psychosis is aggravated by hyper-

thyroidism rather than the cause of its production. Any patient with psychosis, or delirium, should not be operated upon, regardless of the apparent simplicity of the condition. The results are almost always unsatisfactory and frequently end fatally. When there is a definite history of personal or familial psychosis associated with the hyperthyroidism, but little, if any, improvement with treatment of any kind can be expected, as the disease usually progresses to fatal termination. Operation is decidedly contraindicated.

**DIAGNOSIS**—E. P. Joslin and F. H. Lahey (Am. J. M. Sc. 176:1 (July) 1928) discuss the relation and differential diagnosis of *diabetes and hyperthyroidism*. Increased blood sugar with glycosuria is not rare in cases of hyperthyroidism. Therefore for the diagnosis of diabetes in goiter, the authors have raised the standard to a blood sugar of 0.15 per cent in the fasting state, and 0.20 per cent or more after meals, in addition to the glycosuria. The hyperthyroidism usually precedes the appearance of the diabetes in persons with thyroid disease, diabetes being twice as frequent as in persons with surgical conditions without hyperthyroidism. The majority of thyroid diabetics are females. The treatment consists in **dietary regulation** and the administration of **insulin** and **Lugol's solution**.

S. M. Eldh (Acta Med. Scandinav. 69:286 (Sept. 28) 1928), in a study of the basal metabolism of goiter at puberty, reports that this factor may be within normal limits even with clinical symptoms of Basedow's being present. A single clinical symptom does not justify the diagnosis of hyperthyreosis, nor does a normal

basic metabolic rate rule out such a diagnosis in the presence of clinical symptoms.

**PROPHYLAXIS**—Endemic goiter *prophylaxis* is still a subject of numerous contributions, that of O. P. Kimball (J. A. M. A. 91: 454 (Aug. 18) 1928) giving a satisfactory statement of the situation, which remains as for some years past, *et al.*, **iodine** administration is the best known procedure. As a result of his observations Kimball is convinced there is no basis for the theory that iodized salt may induce hyperthyroidism in long standing goiters of adults. The condition is individual and constitutional—this is aggravated by endemic goiter. Hence by preventing the latter the future development of hyperthyroidism is prevented.

**TREATMENT**—Turning now to treatment other than the surgical, H. Moll (Brit. M. J. 2: 51 (July 14) 1928) indicates a **diet** rich in carbohydrates, this however is in the experimental stage and should hardly be used where glycosuria or hyperglycemia give indication of diabetic tendency. A. S. Jackson (Am. J. Surg. 6: 7 (Jan.) 1929) obtained immediate and remarkable improvement in 300 cases of *exophthalmic goiter* by **iodine** administration. In toxic goiter, however, its use is not advised. F. A. Coller and E. B. Potter (Am. J. Surg. 6: 609 (May) 1929) find in a comparison of the reaction to iodine of *exophthalmic goiter* from a goiter area and a non-goiter area, that in general the former do not improve as much. In 11.7 per cent of cases no drop in basal metabolic rate occurred.

S. F. Haines and W. M. Boothby (Am. J. Surg. 7: 174 (Aug.) 1929) consider that treatment of complica-

tions incident to goiter by **oxygen** benefits a larger proportion of patients. H. W. Nott (Brit. M. J. 1: 443 (Mar. 7) 1925) combined **thyroid** and **manganese** treatment of thyroid disorders. This has yet to receive wide testing and acceptance notwithstanding the modest claims of its proponent. Others are ardent advocates of **radium** and **x-ray** treatment of *toxic goiter*. Their beliefs are derived from statistical studies of the literature.

**GOLD THERAPY.**—Although enthusiastic clinical reports are to be found in the literature with respect to reputed favorable results obtained in **tuberculosis** from treatment with various gold preparations, the experimental data fail to confirm. O. Bang (Ztschr. Tuberk. 47: 280, 1927), Opitz (Beitr. z. Klin. d. Tuberk. 66: 144, 1927) and K. Weise and their co-workers (Beitr. z. Klin. d. Tuberk. 66: 144, 1927) found differential healing reaction in neither tuberculous rabbits nor guinea-pigs on administration of gold compounds advocated for therapeutic use. Gold lysalbinat administered intravenously is excreted largely through the intestine, partly through the kidneys. Colloidal gold solutions are retained for days. Practically all the injected metal can be recovered from the liver and spleen, 95 per cent being in the liver. A very small amount is excreted into the gall-bladder. The kidneys and lungs contain very little  $\text{NaAuCl}_4$  or *sanocrysin* is excreted in the urine. Here the largest portion is found in the kidneys, the liver and spleen containing very little.

When sodium aurothiosulphate is given to guinea-pigs, degenerative

changes in kidneys and spleen are found. Schamberg reports a case of staining of the skin with gold following the therapeutic administration of the metal. During the injection of a solution of colloidal gold some was deposited outside the vein. A greenish-blue discoloration occurred which remained for 6 months notwithstanding all attempts at removal.

G. E. Jorgerson (Clin Med and Surg 36 38 (Jan) 1929), from an extended report of studies on the toxicity of colloidal gold, comes to the conclusion that the administration of the pure agent either by mouth or intravenously is harmless, even in enormous doses, but that the impure product is extremely dangerous. He made a detailed study of the histo-pathology of the experimental animals. The kidneys showed parenchymatous nephritis and necrosis with fat droplets in the cells. The liver exhibited central necrosis and fatty degeneration. Necrosis of spleen and adrenals was also present.

**GONADS.**—C. R. Moore and T. F. Gallagher (Am J Physiol 89 388 (July) 1929) have succeeded in extracting from the *testes* of the bull a substance which brings about comb growth in the capon on injection of 0.01 milligram per day of the active concentrate. These preparations also are effective in correcting certain castration effects in the rat and guinea-pig as shown by the spermatozoan motility test, the electric ejaculation test, and the prostate growth test. Therefore, what has hitherto been a matter of good conjecture as to the elaboration by the testis of an internal secretion, has now been clearly demonstrated in scientific ex-

perimentation. C. Eiseman and M. H. Friedman (Proc Physiol Soc Phila, Am J M Sc 177 459 (Mar) 1929) were unable to support the claims that the administration of rabbit sperm to female rabbits, and the intramuscular injection of rat sperm into female rats, results in the production of isospermatotoxic antibodies. Yet, in the guinea-pig positive results were obtained. Clinical evidence justifies the belief that the male gonads are important secretory factors in the emotional balance. Typical dementia precox or schizoid characteristics were observed in 23 eunuchs. Of 70 schizophrenic males at least 60 per cent were eunuchoid in type and only about 6 per cent had apparently normal testes. Consistent with this is the report of S. Kartal (Arch f klin chir 155 324 (Apr 25) 1929) that castration in 19 cases of perversion led to complete restoration to normal.

Turning now to gonad activity as concerned in reproduction, O. Riddle (J A M A 92 943 (Mar 23) 1929) summarizes the situation in the statement that nearly all the internal secretions are intimately concerned in one or another special aspect of this process. The facts now known, indicate that the essential aspects of the mechanism of reproduction are not under the direct or immediate control of nerves. It seems probable that the true hormones may now be best regarded as agents devised primarily for regulation activities and co-ordinations incident to essential and irregular rhythm.

A female sex hormone called "*menformon*" has been isolated by E. Laqueur and S. E. de Jongh (J A M A 91 1169 (Oct 20) 1928) from

placenta, follicular fluid, amniotic fluid, testes, and urine. It is water soluble. It produces estrus in ovariectomized rats and mice, it increases the size of the juvenile uterus and tubes, it induces growth of mamma in both males and females, it has an anti-masculine influence on the male genitalia, it is non-toxic, resistant to heat and action of alkalies, acids, and enzymes. Its clinical use is yet to be established.

**GONORRHEA.**—Gonorrhea, so long considered as an outcast and a veritable "Nobody's Child," is now receiving sober thought by authors of a higher type, writes P. S. Pelouze (*Amer Med* 35 396 (June) 1929) who deplores the little knowledge available in so far as "cure" is concerned. He predicts a greater degree of advancement of knowledge in the next few years than in the previous twenty-five.

**ETIOLOGY.**—In a series of 388 cases, M. A. Saigrajeff and E. T. Linde (*Dermat Wchnschr* 86 695 (May 26) 1928) investigated the incubation period of gonorrhea and found in 270 patients infected for the first time a period no longer than 4 days. Of 118 cases who had a second attack, 95 had an incubation period of 4 days also. There was therefore no difference.

**DIAGNOSIS.**—That the bacteriological diagnosis of certain cases of chronic gonorrhea is at times difficult, because of the change of the Gram-positive cocci to Gram-negative by phagocytosis and other influences, is discussed by W. Flessa (*Zentralbl f Gynak* 52 1198 (May 12) 1928). The author recommends, therefore, a special technic in which he intro-

duces a silk thread, previously sterilized, into the urethra and cervix. A smear culture is then made on a boiled blood agar plate.

David Watson (*Urol and Cutan Rev* 21 203 (Apr) 1927) feels that negative findings on 3 successive examinations, 1 taken soon after a menstrual period, justify an opinion of freedom from infection.

That a serodiagnosis, which was applied successfully to several hundred cases of gonorrhea in women, is a valuable aid is expressed by E. Kunewalder and J. Schwarz (*Wien klin Wchnschr* 42 387 (Mar 28) 1929). This is also the opinion of C. F. Funk (*Dermat Ztschr* 35 125 (Jan) 1929) who reports a series of 700 sera, 600 of which were clinically and bacteriologically established as gonorrhea. The author also reports a positive diagnosis in a case of polyarthritis rheumatica, 2 cases of polyarthritis acuta, and 2 cases of scarlet fever, in all of which no gonorrheal process was, or had been, present.

Semen culture, for the detection of gonococci or their absence, as an assurance of a complete cure in cases of complications, is suggested by M. Gory and A. Jaubert (*Presse méd* 36 388 (Mar 28) 1928). Variations in result, depending upon the types of culture media used, are shown by P. Barbellion (*J d'urol* 24 36 (July) 1927). In 1923 the author reported positive results in 50 to 60 per cent of his cultures, whereas now, he obtains only 4 per cent positive. He believes the organisms seen in his previous cultures were not gonococci.

That **GONORRHEA COMPLICATING PREGNANCY** is rather rare, as shown by the statistics of the London Maternity Hospital, 1922-1927, where

in 10,000 confinements only 8 cases were found, is the thought of E L Holland (Brit J Ven Dis 4 205 (July) 1928). However, when it is present, the author feels it is of great importance to diagnose and treat the condition before delivery, since the post-partum uterus is particularly susceptible to infection.

**TREATMENT.**—That the treatment of gonorrhea in the male has not advanced in the past decade is deplored by H S Jeck (J A M A. 93 249 (July 27) 1929), who advocates the addition of acriflavine to the therapeutic armamentarium in *gonococcal urethritis*. In the very acute type, however, he omits all local treatment, he believes that the treatment of the acutely inflamed urethra by injections is safer than by forced irrigations. He questions the value of vaccines. In certain types of chronic gonorrhea and in metastatic gonorrheal infections they do, however, apparently exert a favorable influence. Their use to produce a foreign protein reaction is not without danger. The author thinks that the status of diathermy has not been established as yet.

In a series of 200 cases of acute anterior gonococcal infections L L Michel (M J and Rec 127 87 (Jan 18) 1928) reports the results of **diathermy**. He found that after 4 weeks of treatment this method did not destroy the gonococcus, nor did it have any effect upon the secretion. He found, however, that in chronic anterior infection it was very useful. Likewise in posterior *urethritis*, *prostatitis*, and *seminal vesiculitis* good results were obtained. The author does not think that treatment should be limited to diathermy alone.

That **diathermy** is useful in gonococcal infections of the genito-urinary tract, partly because of the direct action of the heat on the invading organisms and partly because of the effect of the heat upon the invaded tissues, is mentioned by V D Washburn (Hahnemannian Monthly 64. 517 (July) 1929). At the same time, the author is determined that elimination of the infection in the male and female is a matter of great difficulty. *Gonorrheal affections of the cervix uteri and urethra* were also apparently successfully treated with **diathermy** by F A Maguire (M J Australia 2 38 (July 13) 1929). That the organism is delicate and cannot survive a temperature of 39.4° C (102.9° F) is the basis of treatment. After several applications the discharge ceases, having previously become watery. In a collection of 500 cases, 200 of which were his own, W S Pugh (Physical Therap 46 32 (Jan) 1928) found 70 per cent, the vast majority of which were acute cases, showed apparent bacteriological and clinical cures. From the standpoint of secrecy, the author thinks that treatment by **diathermy** is ideal in that the patient does not have to have a douche bag or medicines about the room.

That *gonococcal arthritis* in women responds by treatment of the cervix with **diathermy** is reported by C A Robinson (Proc Roy Soc Med Sect Electrotherapy 22 1 (Jan) 1929). The author, in 9 years of treatment, has found very few cases refractory to this method. That the gonococcus is thermolabile, not only *in vitro* but *in vivo*, is the clinical observation of P. Pediconi (Urol and Cutan Rev 33 75 (Feb) 1929), who reports excellent results from **diathermy** in the

subacute and chronic types of cases. The author advises against this method, however, during pregnancy.

**Trypaflavine**, intravenously in doses of 10 c c ( $2\frac{1}{2}$  drams) of a 0.5 per cent solution is suggested by Mendez Alvarez (Arch de med cir y espec 29 673 (Dec 15) 1928) who from a series of 100 cases recommends the drug both in acute and chronic cases. In the acute stage it shortens the time as well as the duration of the disease. He also believes it is a specific in *gonococcal cystitis*. Likewise, in a series of 140 cases, 110 of which were males, Josef Konrad (Urol and Cutan Review 32 318 (May) 1928) reports good results with the intravenous injection of **trypaflavine**. In women, however, the benefit derived is not so clear. The disease in the cervix is less easily influenced than in the urethra. Co-existing adnexal disease remains uninfluenced.

A freshly prepared solution of a finely suspended **silver iodide** (from 0.5 to 1.5 gm— $7\frac{1}{2}$  to  $22\frac{1}{2}$  grains—dissolved in 20 c c (5 drams) of distilled water) is recommended by S. R. Naidu of Madras (Brit M J 1 139 (Jan 22) 1927). The author injects 20 c c (5 drams) into the urethra and allows this to remain *in situ* for 15 to 30 minutes by means of a soft bandage. After 6 such injections the discharge disappears. Ten cases are reported.

**VACCINES**—The use of a pure fresh culture of living gonococci injected subcutaneously is used by Loeser, of Berlin, in the treatment of chronic gonorrhea in the female which has resisted other forms of treatment. Of 118 cases treated by other methods unsuccessfully, 68, or

about 60 per cent, recovered after a single injection. The treatment should be given only if the patient has not had treatment for the previous 6 to 8 weeks, so as to be sure the case is in the chronic stage. Likewise, F. Wolff (Zentrabl f Gyneck 52 674 (Mar 17) 1928) gives the same results. The difficulty in this type of treatment is the problem of obtaining the pure culture. This author has overcome this by the commercial production of a pure culture in ampoules which is potent until the expiration date which is usually after 2 to 3 months.

In a review of the literature dating back to 1906, V. Manca-Pastorino (Gior ital di dermatol sifil 69 582 (June) 1928) reports that **autovaccine** treatment of gonorrhea is excellent. In the author's own series, which was divided between acute and chronic types, good results were also obtained. The injections contained as a minimum 50 million germs and a maximum of 200 million germs. Three cases of *gonorrheal endocervicitis* in pregnant women, and resultant cure with this method of treatment, are reported by J. Audebert and J. B. Giscard (Rev franç de gynec et d'obst 24 145 (Mar) 1929).

**X-ray** treatment in a series of 50 cases suffering with complications (male) gave good results, according to D. Gunsberger (Fortschr d Therap 4 513 (Aug 25) 1928).

The use of **gaseous dilatation**, in chronic cases, is reported with good results by Bizard and Maisler (J de méd de Paris 47 313 (Apr 19) 1928).

The production of an **aseptic abscess** by the injection of 0.5 cm of turpentine into the thigh with its subsequent pain and fever, is advo-

cated by S. Nittis (New England J Med 199 1041 (Nov 22) 1928) who reports a series of 11 refractory cases. A complete cure within 1 week resulted in 7 cases following 1 injection. In the other 4 cases the results were less definite.

*Vulvovaginitis* may be caused by various micro-organisms and by thread worms, but the gonococcus is responsible for 80 per cent of the cases in children, according to D. Lees (Edinburgh M J (May) 1928). The author uses **picric acid** ( $\frac{1}{8}$  to 1 per cent in glycerine), **silver nitrate** and **chlora-mine-T**. These are alternated weekly. He also suggests the use of **vaccine** as an aid in treatment. In a series of 42 cases of gonococcal vulvovaginitis in children T. J. Williams (Am J Obst and Gynec 16 861 (Dec) 1928) used a 5 per cent solution of **mercurochrome** with good results. The average case required 4 weeks to obtain negative smears. A child of 8 years suffering with malignant edema of the genitals, due to a combined infection of gonococci and diphtheritic organisms, was treated with an injection of **diphtheria antitoxin** by M. Rodriguez (Paris méd 2 434 (Nov 26), 1927) after other methods of treatment had failed. Prompt improvement followed. Later, the author used this treatment in gonococcal complications in the male and in a series of 100 cases obtained good results.

That *rectal gonorrhea* in females occurs to the extent of 38 per cent is reported by L. Singer (Dermat Wchnschr 86 506 (Apr 14) 1928). The author recommends **Glinger's treatment** which consists of washing out the rectum through a Nelaton sound and recovering the water.

**GRADENIGO SYNDROME.—**  
**PATHOGENESIS.**—The rarity of this syndrome—combination of acute otitis and isolated external rectus paralysis—is explained by E. Oppikof (Ztschr f Hals, Nasen- u. Ohrenh 21 454 (May 10) 1928) on the ground that for its production the following 4 conditions must co-exist: (1) The petrous bone must contain pneumatic cells to the depth of the internal auditory canal or to the apex of the pyramid, and this is rarely the case, (2) this highly pneumatic bone must be invaded by an acute otitis, (3) the associated inflammation of a deeply situated mastoid cell must not heal, in order that circumscribed inflammation of, or extradural abscess at, the apex of the pyramid may develop, (4) the inflammation at the apex of the pyramid must not only extend to the abducens nerve, but infiltrate it to a considerable degree.

**GRANULOMA INGUINALE.—**  
**ETIOLOGY.**—Several reports have appeared tending to localize the cause of this disease to the bodies described by Donovan in 1915 and since called Donovan bodies. J. A. McIntosh (South M J 21 434 (June) 1928) cultured the bodies *in vitro*, finding that the experimental incubation period for the disease is 42 days. M. F. Campbell (Am J Med Sc 174 670 (Nov ) 1927), working before McIntosh's article appeared, was unable to prove the specificity of the bodies which he, however, cultured on Sabouraud's medium. Perhaps he did not allow sufficient time to elapse. The older finding that mononuclears are the predominant cell in the infection is confirmed again and the statement made that it is the

chief factor in the destruction of the bodies

**TREATMENT.**—Tartar emetic (potassium antimony tartrate) is the specific remedy. It is given intravenously beginning with 2 c c (32 minims) of a 1 per cent solution and increasing 1 c c (16 minims) every other day until 10 c c (2½ drams) are given. As a rule, the results are dramatic, healing takes place very rapidly. Apparently antimony is stored in the body, which is of advantage since relapses may occur if treatment is discontinued too soon. The causative agent may remain alive for months in the scars of an apparently healed lesion.

G Giglioli (J Trop Med 31 245 (Oct 1) 1928) states that failure to obtain results with tartar emetic does not mean resistance to antimony. Some other preparation of this metal may be of more value in the special patient.

**GRAVES'S DISEASE.—ETIOLOGY**—I Bram (Physical Therap 47 153 (Mar) 1929) in an analysis of many cases of this disorder found that a clear history of physical trauma was present in 85 per cent. Local or general infection accounted for 5 per cent. Iodine or thyroid substance ingestion was responsible for 4 per cent. The etiology in the remaining 6 per cent was unascertainable. In the traumatic cases, 13 per cent followed accidents or imminent personal danger, 7 followed a minor surgical procedure, 4 per cent came with parturition, and 61 per cent were sequels of worry, grief, disappointment, and business troubles. The psycho-sexual make-up of the female plays a greater part in the

pathogenesis than it does in the male. Mere facts speak against treatment by thyroidectomy in the larger number of patients. Although inherited and familial presence of Graves's disease is often suggested, sight should not be lost of the probability that the thing is neither, but merely a reaction to similar living conditions, diet, environment, and temperamental outbursts. While basal metabolism tests are generally indicative of the severity of the disease, there are many exceptions due to neuro-circulatory states. Severe Graves's disease is at times found which exhibits no increase in basal metabolic rate, and cured cases are encountered with a continued high rate. According to Bram, the syndrome is not goiter, but a constitutional condition in which the autonomic system and the ductless glands are in a state of disequilibrium; the participation of the thyroid is sequential. In the hyperthyroidism of toxic adenoma it is the thyroid that makes the body sick. In Graves's disease it is the body that makes the thyroid sick. This point of view is reasonable, but it must be remembered that the thyroid must be treated in both cases as well as the body.

**TREATMENT**—The treatment should include rest of body and mind, simple diet with a minimum of meat and drugs with careful individualization. Quinine, corpus luteum, posterior pituitary, suprarenal cortex, arsenic, and luminal are substances which have been found useful as reported in the literature. Not to be given are thyroid extract, iodides, opiates, digitalis, and suprarenal medulla. Psychotherapy is of great help.



**GROWTH.**—With the ever-increasing realization of the importance of radiant energy in life processes, it is not strange that studies of selective solar radiation on growth have been instituted. C. Sheard and G. M. Higgins (*Science* 67: 534 (May 25) 1928) report that the presence of both the longer and shorter ultraviolet wave lengths of sunlight is essential for growth of chicks. This confirms the earlier work of Bovie and is obviously applicable to man. With the increase in the knowledge of dietary constituents apart from the caloric, a more strict analysis of the relation of diet to growth is indicated. This must take into account the query as to whether increased growth is due to increased food intake (or stuffing) *per se* or whether the growth acceleration is induced by adequacy of growth-essential vitamins and amino-acids, which as a secondary effect stimulate greater food ingestion to supply the increase in assimilation capacity. Reason tells us and experiment shows that increase in food intake accompanies an adequately constituted diet, while decrease in growth stimulating properties of a diet is followed by a decrease in total food ingestion. Hence, it follows that growth increase is primarily due to dietary adequacy. That is to say, the maximum effectiveness of added calories to the diet is only obtainable when and if there is also added to the diet sufficient essential amino-acids and vitamins to accelerate the assimilatory capacity of the organism to the level where the increased caloric intake can be utilized in the laying down of more body substance. As a corollary, it is obvious that an increase in vitamins and—or—amino-

acids will be useless unless an increase in calories is concomitantly made, else the assimilatory stimulation can not come to full expression.

The importance of the glands of internal secretion in growth is well known. The positive evidence furnished by H. M. Evans and his collaborators (*J. A. M. A.* 91: 1337 (Nov. 3) 1928) that the administration of fresh daily implants of anterior lobe substance accelerates growth markedly, completes the cycle begun by Cushing's demonstration of growth retardation subsequent to pituitary ablation. Some data are to be found in the literature to the effect that the spleen is a factor in early growth. In animals deprived of the spleen before the critical periods (20 to 40 days post partum in dogs) all gain in weight ceases at first. Then occurs a slower than normal rate of increment. Striking changes take place in the bony skeleton, the blood, lymph nodes, and internal organs. Older animals are not so affected. Early splenectomy of parents does not affect the progeny. The growth retardation is not to be attributed to diminished food intake. The suggestion is made that certain infantile growth difficulties in malaria and syphilis may be due to splenic involvement.

Chondromatous disturbances in development occasionally give rise to the so-called Ollier growth abnormality. Such a case observed for 22 years is reported by J. G. Chrysopathes (*Ztschr. f. orthop. chir.* 51: 177 (Jan. 11) 1929). From a comparison of it with 10 previously reported, the conclusion is made that the developmental disturbances ac-

companying the chondromatosis are explained by the preponderating involvement of the epiphyses, and that the unilateral involvement generally believed to be characteristic of the condition is not constant. Up to the present time, no nerve changes have

been demonstrated as the basis of the disturbance. The best theory seems to be that of von Recklinghausen which ascribes the condition to an early disturbance in the anlage of the cartilage when this is being transformed into bone

## H

### HAY-FEVER. — ETIOLOGY. —

That hay-fever is due to the action of some offending pollen on a susceptible mucous membrane is an accepted fact, but much work must yet be done in determining those factors which produce susceptibility in some individuals and not in others. One can at times find cases with definite nasal pathology who experience typical hay-fever and on the removal of the underlying cause in the nose the symptoms disappear. Hay-fever must generally be considered from the standpoint of allergic reactions, and as such, further studies of blood chemistry, metabolism, etc. may some day open up before us the portal through which we can see the definite etiologic basis underlying individual susceptibility toward certain offending substances such as pollens, feathers, food-stuffs, etc.

In considering the histories of these unfortunate victims, one cannot avoid being impressed with the hereditary tendencies which these patients express, such as asthma, migraine, vasomotor rhinitis and eczema.

J. E. R. McDonagh (Lancet 2 271 (Aug 10) 1929) asserts that asthma and hay-fever are symptoms of inherited disease caused by the precipitation of hydrated protein particles and by the lack of oxygenated blood

in the respiratory tract. The chief signs and symptoms of inherited disease are malcoordination and a chronic intestinal intoxication. By correcting the malcoordination and removing the chronic intestinal intoxication hay-fever can usually be prevented.

Of 441 perennial hay-fever cases studied by Balveat (South M J 22 492 (May) 1929), none were found in which close questioning did not elicit a definite history of itching of the mucous membranes of the eye, nose, roof of the mouth, posterior pharynx or Eustachian tubes. Twenty-nine gave a bilateral family history, 240 a unilateral family history, and 172 gave a negative history of allergy in the family. One hundred and fifty-seven were complicated with asthma, in 28 hives were associated with the perennial hay-fever, in 36, eczema, in 17 migraine.

G. T. Brown (J A M A 92 465 (Feb 9) 1929) reports a case of perennial hay-fever due to parrot feathers. The patient, aged 30, suffered with symptoms of running nose, pronounced irritation of eyes and nose, and feeling of fulness in the head. The symptoms became worse until the patient had almost constant clear watery discharge from both nostrils. Various forms of treatment were of no benefit. Ninety-seven cutaneous

tests with food, animal epidermal, stock bacterial, and pollen proteins were all completely negative with the exception of a positive reaction to parrot feathers. Two days after getting rid of a parrot, which the patient was so fond of that he even took it in the shower bath with him, all symptoms had disappeared and patient has remained well since.

The relationship between vasomotor rhinitis and pathological intestinal findings have been discussed by D. Adlersberg and L. Forschner (Wien klin Wchnschr 41 955 (July 5) 1928). They state that the diagnosis of so-called vasomotor rhinitis is based upon both subjective symptoms and sometimes very slight and frequently even negative findings in the nose. These are the cases which usually require an unusually great number of handkerchiefs during the day. In the author's series of 17 patients with vasomotor rhinopathy, in whom strictly anaphylactic allergic cases were excluded, 14 showed a pathologic intestinal finding. This consisted mostly in obstinate constipation, with secondary signs of irritation in the colon. Among these cases were transitions up to pronounced proctosigmoiditis and enterocolitis. Among 14 cases treated for intestinal conditions 8 showed intensive improvement of their nasal condition, while 6 remained unaffected.

**TREATMENT**—Of interest is the unusual case of vasomotor rhinitis treated with **tuberculin** as reported by N. de F. Bunkeflod (Ugeskr f Laeger 90 1091 (Nov 22) 1928). He records the case of a man, aged 29 years, who had been subject to violent attacks of vasomotor rhinitis since the age of 10. The violent attacks oc-

curred in the hay-fever season or soon after his bed had been made. Cutaneous tests with cat's hairs, goose feathers, and certain grasses provoked large vesicles. Pirquet's reaction was positive. A course of 10 injections of Koch's old tuberculin, at intervals of a week, was given, the first dose being 1/10,000 c.c. There was a violent local reaction and the temperature rose to 102° F (38.8° C), the same amount a week later provoked an equally violent reaction. The dosage for the following 6 injections was, therefore, reduced to 1/100,000 c.c., but that of the ninth and tenth injections was increased to 1/50,000 c.c. The attacks of vasomotor rhinitis ceased during this treatment, and had not recurred 6 months later. The patient could now lie in a haystack with impunity and touch, without discomfort, the mucous membrane of his nose with the same grass to which he had been shown to be sensitive.

According to S. van Leeuwen (Therap d Gegenw 70 244 (June) 1929), patients with allergy show a strongly positive Von Pirquet reaction. The injection of **tuberculin** has a beneficial influence on both *asthma* and *hay-fever*. Tuberculin therapy alone is insufficient to induce marked reduction in sensitivity in the majority of cases, and additionally **specific therapy** is used, according to whether the patient is sensitive to grain mixtures or weed mixtures. Even after successful desensitization, the positive skin reaction persists, though with less intensity.

Typical hay-fever may be divided into 2 types, that which occurs in spring and early summer, due to pollens from trees and grasses, and that

which occurs in fall, due to ragweed pollen. In the treatment the greatest emphasis is laid on the **desensitization** of the sufferer to the offending pollen, feathers, food, etc. Ramirez (Am J M Sc 176 856 (Dec ) 1928), on the basis of his study of 425 cases, is of the opinion that it is important to give a large amount of pollen before the onset of the pollen season and that it is absolutely essential to continue treatment throughout the entire season. **Autogenous vaccines** (from the nose) given together with pollen, during the season, are helpful. While the results obtained when several pollens are used are apparently better than those obtained from a single pollen, the more advantageous results are due not to the number of pollens employed, but to the fact that a much larger dose of total pollen protein was injected than of a single pollen. He believes that the best results are obtained in patients coming about 3 months before the expected date of pollination, receiving 2 weeks' intensive treatment, increasing the dose of pollen rapidly, and continuing injections up to the pollen season, reaching as high a dose as possible, and then continuing injections of pollen twice a week throughout the entire season.

Among the drugs which afford some relief to the hay-fever sufferer is **ephedrin**. F. W. Gaarde and C. K. Maytum (Am J M Sc 174 635 (Nov ) 1927) report the following results. Ephedrin given by mouth in 25 mg. to 60 mg. ( $\frac{5}{12}$  to 1 grain) doses, afforded temporary relief to slightly more than 50 per cent of the patients with autumnal hay-fever, an additional 25 per cent obtained sufficient relief to consider its use warranted. Ephedrin given in a 3 per

cent solution, as a nasal spray, is less efficacious and the relief of shorter duration. The effect of both the local and internal administration seemed to depend on the severity of the paroxysm and the good results were obtained in the milder seizures. The neurotic temperament and nervous state of the patient are important factors in the production of tremor, rapid heart action, and other distressing symptoms produced by the drug. The authors emphasize that whenever good effects are obtained, they are temporary and symptomatic.

Among other remedies used in the treatment of hay-fever is **nitromuriatic acid**, suggested by Gleason as early as 1903. H. Beckman (M J and Rec 130 9 (July 3) 1929) states that in a group of 185 treated by 26 physicians during the summer of 1928, approximately 66 per cent obtained marked or complete relief from symptoms by the ingestion of a **mineral acid** 4 times daily during their season. None of the patients taking the acid treatment experienced any sort of reaction therefrom, nor did any of those who were relieved object to the strong taste of the medicine. Certain observations are cited in support of the belief that allergic patients are benefited by instituting in them a state of slight or potential acidosis, whether this is accomplished by the actual employment of acids or by some other means.

**Diathermy** has been used with good results in hay-fever, as reported by Herman (Deutsche med Wchnschr 55 355, 1929). He treated numerous patients of various ages, employing specially prepared electrodes for application in the nose. For the treatment of the conjunctiva he advises

instillation of 1 drop of 1 1000 solution of **epinephrin hydrochloride** 3 times a day This must be continued for the duration of the attack The author asserts that the ocular condition completely disappeared as a result of this treatment

**HEAD INJURIES.**—The increasing number of accidents each year due to the rapid means of transportation and industrial activities frequently associated with cerebral trauma has brought forth a large number of reports and observations devoted to the analysis and treatment of these conditions

**DIAGNOSIS**—C W Rand (Arch Surg 18 1176 (Apr) 1929) points out the significance of the dilated pupil and found that there was a large hematoma on the side of the dilatation although in several cases neurological signs indicated a lesion on the opposite side He concluded the pupillary phenomenon was more important than the hemiplegia which might be present

**TREATMENT**—The tendency during the past 6 years has been toward more **conservative** means of **treatment** and the abandoning of decompressive operations so popular in the past Many authors have taken a firm stand against operative intervention unless focal signs of compounded fractures demanded surgical relief

F Beekman (Ann Surg 87 355 (Mar) 1928) in a report of 331 cases of injury to the head in children strongly condemns operative procedures Simple depressed fractures usually require no surgical intervention unless focal signs are present or persist Fourteen cases of compound

fracture were operated upon Approximately 23 per cent of the patients when followed up gave symptoms of post-traumatic sequels, the most prominent of which was headache, in less than 5 per cent some permanent injury existed. The author strongly favors **conservative treatment**

W P Eagleton (J M Soc New Jersey 25 567 (Sept) 1928), calling attention to the value of **conservative treatment** without operation, divides the surgical indications of those cases showing no signs of traumatic encephalitis and no increase of cerebrospinal fluid pressure into 6 groups, the first 4 dealing with extradural and subdural hemorrhage, the fifth with compound fractures of the skull, and the sixth with traumatic encephalitis without fracture of the skull associated with increased intracranial pressure, or papillo-edema

Recently C. H. Frazier (Penn Med J 33 466 (April) 1930) states, in reference to operative intervention "I have no brief for operation save to condemn it" and refers to "the haphazard practice of doing subtemporal decompressions, once so prevalent, now on the wane, and soon to be altogether abandoned" His indications for operative intervention are similar to those of Eagleton and Beekman and he points out the post-traumatic possible sequels and the diagnostic and therapeutic value offered by **encephalography**, stating "We have come, therefore, to regard the encephalogram as an essential agent in the study of the patient with post-traumatic sequels"

The advances in our knowledge concerning the cerebrospinal fluid circulation and intracranial pressure

mechanism during the past 10 years make possible satisfactory control of intracranial pressure without need for decompressive operative procedures. The principle of decompression was based upon the need for brain expansion and relief of pressure by increasing the cranial cavity volume in this way. The disadvantages lay in insufficient decompression, added trauma to the original injury and the establishment of a permanent cranial defect should the patient survive. The advantage gained by such a procedure was limited to the displacement volume in a brain hernia which resulted and as this very rarely exceeded 30 to 60 c c, the same results were obtained by frequent **spinal drainage** and the use of dehydrating agents especially **hypertonic solutions**.

L H Weed and P S McKibben (Am J Physiol 48 512 (May) 1919) demonstrated that hypertonic solutions when given by vein or bowel reduced *intracranial pressure* and this led to the clinical use of **hypertonic sodium chloride solution** intravenously by Cushing and Foley (Proc Soc Exper Biol and Med 17 217, 1920) and Sachs and Belcher (J A M A 75 667, 1920) giving demonstrable relief of intracranial pressure and clinical symptoms, due to this condition. **Magnesium sulphate** by mouth and rectum was advocated by C E Dowman (J A M A 79 2212 (Dec 30) 1922) and T Fay (J A M A 80 1445 (May 19) 1923) with beneficial effects upon cerebral edema and intracranial pressure both in the traumatic and chronic intracranial pressure groups.

H S Howe (Assoc Research Nerv and Ment. Dis, 1924) demonstrated

the value of **hypertonic dextrose solution** intravenously in the reduction of *intracranial pressure* and M M Peet (J Michigan M Soc 26 16 (Jan) 1927) pointed out the value of this procedure in reducing pressure in cases of cerebral trauma.

The need for **restricted fluid intake** to assist in the accomplishment of a proper dehydration, by hypertonic solution, for reduction in *intracranial pressure* was pointed out by T Fay (J A M A 84 1261 (Apr 25) 1925) and it has been by a judicious and combined use of all these methods that intracranial pressure following cerebral trauma has yielded to a more satisfactory degree than from the former operative methods. Frequent **spinal drainage** has assisted materially in gaining an early objective.

M M Peet (New York State J Med 28 555 (May 15) 1928) discusses the recent methods of treatment and diagnosis of acute cranial and intracranial injuries with the following conclusions:

- 1 'All compound and all depressed fractures of the skull should be **operated** upon, the former to prevent infection of the bone, meninges, and brain, and the latter for adequate treatment of lacerations of the brain immediately beneath the fracture.

- 2 Local pressure manifestations are a definite indication for operation. The method of choice is Cushing's **subtemporal decompression**.

- 3 Operation should not be performed for increased intracranial pressure alone.

- 4 **Lumbar puncture** is a safe and rapid method for the temporary reduction of pressure and in cases showing pressure symptoms should

be performed immediately after the patient's admission to the hospital

5 The most effective method of reducing increased intracranial pressure of traumatic origin is the intravenous administration of a **hypertonic solution**, preferably saturated **Ringer's solution** and 50 per cent **glucose**"

The Reviewer has instituted the following method in his clinic which has yielded so far the most satisfactory results in the management of intracranial trauma. Immediately upon the admission of the patient the temperature, pulse, respirations and blood-pressure are obtained. Fifty cc ( $1\frac{2}{3}$  ounces) adult dose—of 50 per cent **glucose** is immediately given intravenously to combat shock and subsequent cerebral edema. Total **fluid intake** is restricted to 20 ounces (600 cc) per 24 hours. When shock is profound and need of fluid is present to combat circulatory deficiencies (50 to 100 cc— $1\frac{2}{3}$  to  $3\frac{1}{3}$  ounces) of normal **saline solution** is given intravenously. It has been found better to repeat a small dose than to permit fluid in excess so as to prevent the secondary intracranial pressure and cerebral edema which promptly follow the introduction of fluids. **Atropine**, **pituitrin**, **strychnine** and heat (shock cabinet) are given to assist in the relief of shock. Scalp suture or x-ray is not permitted until the patient is safely out of the period of shock (temperature normal or above). A careful neurological examination and a **spinal puncture** is made as soon as the patient responds and is over the period of shock. A careful manometric reading of the spinal fluid pressure is taken and observation made as to whether the fluid is clear or bloody.

If the spinal fluid is bloody, complete **drainage** of all fluid that can be obtained is indicated. If the fluid is clear drainage of fluid is allowed until the pressure falls to normal (8 mm Hg in the horizontal position). Fifteen minute temperature, pulse, respiratory and blood-pressure records are kept throughout the first 2 days. Pulse pressure determinations become the most important of these observations. Fluid should not be given the patient above 32 ounces (960 cc) per 24 hours as this has frequently been associated with rising pulse pressure, stupor and signs of cerebral edema requiring active dehydration and spinal drainage. Intravenous **glucose** may be given or **spinal drainage** may be resorted to from time to time where signs of return of intracranial pressure are evident.

After the first 24 hours of limited fluid intake when a continued dehydration is desired **magnesium sulphate** ( $1\frac{1}{2}$  ounces—45 Gm— or crystals in 3 ounces—90 cc—of water) may be given daily or as needed. By means of intravenous **glucose solution**, **reduction of fluid intake** and occasional magnesium sulphate by mouth or rectum, adequate dehydration and reduction of intracranial pressure may be maintained for long periods of time. Where severe pressure is present **spinal drainage** may be resorted to as a rapid means of relief.

The daily **spinal drainage** in cases showing bloody spinal fluid has been advocated up to the seventh or tenth day irrespective of pressure control. The reaction in the meninges produced by the presence of red blood cells has been clearly established by Weed (Bull Johns Hopkins Hosp

31 343, 1920) and C Bagley, Jr (Arch Surg 17 39 (July) 1928) The pathological results of which have been demonstrated by N W Winkelman and T Fay (Arch Neurol and Psychiat 23 44 (Jan) 1930 and Am J Psychiat 9 667 (Jan) 1930) showing that permanent damage is produced in the subarachnoid spaces and within the Pacchionian bodies which have been considered the major outlets for cerebrospinal fluid

The post-traumatic sequels associated with brain atrophy have been ascribed to increased pressure due to disturbance of cerebrospinal fluid circulation and will be discussed below

E Stulz and P Stricker (Bull et mem Soc nat de chir 54 1184 (Nov 17) 1928) report 5 cases of *cerebrospinal fluid hypertension* treated successfully by the use of intravenous injection of **distilled water** This condition results from cerebrospinal fluid fistula where drainage from the ear, nose or through an open wound of the meninges gives rise to a severe loss of cerebrospinal fluid In their cases 40 cc (1½ ounces) of distilled water relieved torpor, headache, vertigo and pain at the base of the neck Bradycardia was not relieved Temperature returned to normal with the cessation of the cerebrospinal fluid leak and recovery occurred in each case

Eagleton (*loc cit*) points out the need of **closing the dural rent** so as to prevent meningitis especially if a cerebrospinal rhinorrhea is present This requires an exploratory craniotomy with a search for the dural tear and should be undertaken not as an emergency operation but with the full preparation for such an operative procedure

This author also takes up the indication for operation upon *focal hemorrhages*, and the treatment and management of craniocerebral injuries from the operative and dehydrating standpoint is taken up by R D McClure and A S Crawford (Arch Surg 16 451 (Feb) 1928) The obtaining of a careful history, use of **tetanus antitoxin**, prompt **débridement** of *compound fractures* and careful and repeated neurological examinations for accessible hemorrhages and focal lesions are stressed by these authors

P Bailey (S Clin North America 9 395 (Apr) 1929) discussed traumatic *wounds* involving the *superior longitudinal sinus* and warns against removal of depressed fragments in this area because of frequent massive hemorrhage due to release of a concealed rent Careful approach to such an area should be made by means of a **craniotomy** The opening in the sinus may be closed by **muscle graft**, or **obliteration** of the sinus by means of pressure Ligation of the sinus is difficult because of its location and shape The consequent disturbance of cerebral circulation in the presence of longitudinal sinus occlusion makes necessary repair or reconstruction if possible This author has found the best method of dealing with large wounds of the sinus to be **inversion of the outer wall** by means of a rounded object

D Armour (Proc Roy Soc Med 22 1 (Nov) 1928) stresses the importance of cerebrospinal fluid *pressure* and the factors concerned in secretion, absorption, and circulation, advocating the frequent use of **lumbar punctures** and **hypertonic solutions** for relief of pressure and the non-sur-



gical treatment for intracranial injuries

It is evident that the modern trend is away from the surgical decompression and toward the non-surgical dehydration, with the increasing evidence of the benefits of the latter. The term decompression has been displaced by exploration, as it has become more evident where focal hemorrhages exist. An exploration may be made at any point to evacuate the hemorrhage, when decompressions for the most part have been confined to the subtemporal area. Although the removal of bone fragments in the compound wounds is decompressive in character, there has been a distinct tendency to save all but the hopelessly damaged fragments and thus permit better reconstruction of the skull following these injuries. No longer are depressed fragments being elevated. The tendency of today is to delay the elevation of such a fragment until after the tenth to twenty-first day following the injury, to determine if permanent focal signs of pressure and irritation may be ascribed alone to the depression. Depressed fractures of the skull are being treated more and more in the light of tumors of the brain. Where focal or pressure signs exist they are considered operable and where late focal signs develop, the encephalogram is being used to indicate the value of surgical intervention.

**CRANIOCEREBRAL POST-TRAUMATIC SEQUELS.**—Since the management of cerebral injuries has evolved into a more rational form of treatment, due primarily to dehydration and spinal drainage and the lack of surgical intervention with mortalities as low as 11.8 per cent

(F. Schuck, *Arch f klin Chir* 153. 77, 1928), 14.7 per cent (McClure and Crawford *loc cit*), and about 10 per cent (Beekman *loc cit*), the attention of the profession has been directed toward the prevention and relief of post-traumatic sequels and a study of economic readjustment of the patient following severe cerebral injury.

C. P. Symonds (*Brit M J* 2 829 (Nov 10) 1928) reports on 80 patients, 18 making a complete recovery. Of 71 who were dependent for their livelihood on regular employment, 33 were able to return to full time work; 31 to light work and 7 were totally incapacitated. Of 54 with minor contusion, about 50 per cent of the patients were partially or totally incapacitated. Of 17 cases with major contusion, 5 were able to return to full time work, 7 to light work and 5 were totally incapacitated.

J. Kassin (*J Nerv and Ment Dis* 69 385 (Apr) 1929) in a study of *mentally defective children* found that 10 per cent of so-called psychopathic personalities had received some injury to the brain during childhood or adolescence. Emotional instability, temper tantrums, egocentricity, loss of ambition and personality changes were ascribed to this cause, encephalography revealing characteristic brain atrophy and gross changes which had been unsuspected and without objective neurological signs.

J. L. Eckel (*New York State J Med* 28 771, 1928) and M. M. Peet (*ibid* 777) discuss the aftermath of head injuries in patients complaining of headache, dizziness, irritability, apathy, fatigue, ear noises, tremor, vasomotor flushing, palpitation and

abnormalities in the gait, and Eckel states that *traumatic epilepsy* develops in about 5 per cent of cases of severe head injury

H K Pancoast and T Fay (Am J Roentgenol 21 421 (May) 1929) point out the diagnostic value of encephalography in the post-traumatic group and the evidence of characteristic atrophy confined to the frontoparietal areas of the brain This is the area usually deficient and found to be small and improperly developed in almost all types of mentally defectives whether post-traumatic, inflammatory, "hereditary" or idiopathic in origin

T Fay (J A M A 94 245 (Jan 25) 1930) ascribes this generalized pressure atrophy following trauma to chronic intracranial pressure due to increased subarachnoid fluid forming an unyielding "hydraulic cast" over the frontoparietal areas of the brain which correspond to the cerebrospinal fluid circulating field and not to the arteriovascular plan

T Fay and N W Winkelman (Am J Psychiat 9 667 (Jan) 1930) point out that this *atrophy* is of the ischemic type and due to pressure The neuropathological studies indicate the same changes as those which are found in gross lesions known to produce cortical pressure

In the light of the work of Weed (*loc cit*) and Bagley (*loc cit*) on the effects of blood in the spinal fluid and subarachnoid spaces with the known period of stupor and pressure following head injuries, these authors ascribe the cerebral *atrophy* to the acute intracranial pressure and have found marked cerebral atrophy to occur within 3 weeks as shown clearly by the encephalogram The origin of

many of the formerly designated idiopathic atrophies could be traced to trauma, inflammation, and degeneration involving the outlets for cerebrospinal fluid, thus favoring its retention and causing the production of a hydraulic cast which rapidly or chronically gave rise to "ischemic" cortical pressure atrophy

The mental deficiencies, headache, dulness and apathy noted in these post-traumatic cases, as well as the epileptic groups, have shown marked improvement when placed upon **restricted fluid intake** of not more than 20 ounces (600 c c) per day, and in a series of cases covering a period of 3 years on such low fluid levels marked progressive mental improvement has been noted during the period of dehydration It has become more evident that water metabolism and cerebrospinal fluid accumulations are closely associated with intracranial pressure disturbances, and with secondarily produced cortical atrophy in characteristic areas of the brain, the objective symptoms of which are difficult to elicit neurologically but gross changes can be demonstrated by means of the encephalogram

One of the most important post-traumatic symptom complexes, namely, vertigo and tinnitus, has recently received consideration from W E Grove (Arch Otolaryng 8 249 (Sept) 1928) He has pointed out that autopsy frequently shows hemorrhages in the temporal bone Intralabyrinthine hemorrhages frequently occur and may be perilymphatic or endolymphatic The nerves may be torn or damaged by pressure from hemorrhage before their entrance into the pyramid or injured in the narrow bone canals leading to the end-organ

The late pathological changes found in persons dying years after an injury to the head are atrophy to the nerve fibers, as well as atrophy of Corti's organ. Of 31 patients with defective hearing, 28 had symptoms referable to the vestibular apparatus. Of 42 cases, disturbance in past-pointing was present in 28. A study of 30 cases showed irritability of the labyrinth to caloric stimulation. The author advocates careful and early labyrinth studies following cerebral injuries.

**TREATMENT** — The principal advances in the treatment of cerebral trauma during the past year have been in the line of conservative application of the physiological principle of **dehydration**, the early determination of subarachnoid hemorrhage with frequent spinal drainage and the careful regulation of fluid intake with relation to output, and its effects upon cerebrospinal fluid pressure and edema, operative measures have been confined for the most part to focal hemorrhages and compound fractures, and the post-traumatic sequels prevented by early management of intracranial pressure and the maintenance of the patient on restricted fluids for a period of time following the injury. Water metabolism has become one of the most important considerations in the treatment of intracranial pressure based upon the observations of J. L. Gamble (*J Biol Chem* 57 633, 1923, *New England J Med* 201 909 (Nov 7) 1929). It is now possible to regulate the tissue needs with due regard to "fixed base," at the same time preventing over-accumulation of fluid not only in the cerebrospinal fluid spaces but elsewhere.

**HEADACHE.**—Recent advances in the knowledge of headache have been limited very largely to increase in the number of drugs used in treating this condition. Almost every pharmaceutical house now produces a coal tar preparation, widely heralded as of high therapeutic efficacy and devoid of untoward results. Actual progress in the understanding of this condition, however, has not been made. L. Schmidt (*Brit M J* 2 15 (July 6) 1929) and others have called attention to peripheral headache due to tissue infiltration. The earlier theories, overemphasizing a gynecological basis, have received a much needed revision, and the vague diagnosis of reflex or pelvic headache is less often and less loosely advanced. The literature contains a number of references to lumbar puncture as a therapeutic measure. L. F. Barker (*Internat Clinic* 1 8 (Mar) 1929) recommends it. W. Penfield (*Surg Gynec Obst* 45 747 (Dec) 1927), and Boyd (*Arch Surg* 18 1626 (Apr) 1929) remove spinal fluid and inject air, the procedure being of value chiefly in *post-traumatic cases* where it seems to result in the breaking up of adhesions that may have formed. The rapid development of specialization brings with it the danger that headache, like many other clinical phenomena, will be viewed from a constricted standpoint, overlooking the important fact that a complete and general physical examination combined with a well-developed history still remain the indispensable factors in the differential diagnosis and intelligent treatment of headache. The treatment of headache is difficult and still far from satisfactory, since the cause is so often obscure.

## HEART.—INJURIES TO HEART AND PERICARDIUM.—

M H Kahn and S Kahn (An Int Med 2 1013 (Apr) 1929) point out that because of the superficial position directly behind the sternum and adjacent cartilages, the heart and pericardium are exposed to danger in injuries to the anterior chest wall. Even in the absence of injury to the ribs or external bruising, an external blow may produce very serious damage to the intra-thoracic structures.

The authors report acute pericarditis, auricular fibrillation, extra-systolic arrhythmia, and heart block, resulting from damage produced in the cardiac tissue and endocardium by direct injury to the organ from blunt violence, such as blows to the chest or indirect injury, as may be sustained in falls from a height.

Functional disturbances or arrhythmia that may develop are determined by the location of the trauma in the myocardial structure.

Rupture of the heart or of its valves, injury to the wall of the aorta, producing a dissecting aneurysm and the rupture of a pre-existing aneurysm, all may result from direct blunt violence to the thorax.

W Spitzmuller (Arch f klin Chir 150 551 (June 21) 1928) relates the case of a man who fell from a height of about 45 feet. At autopsy, 3 days later, a rent 2.5 cm long, was found in the apex of the pericardial sac, with no fluid in the sac itself. The neighboring organs were not injured by the fall.

*Direct Injuries*—*Stab wounds* of the heart have been reported by various authors. H H Schoenfeld (Ann Surg 87 823 (June) 1928) reports 1 new case and reviews 24 cases already

on record, of *traumatic puncture* of the heart. Sixteen of these patients lived and 9 died. Schoenfeld's patient, aged 5 years, fell on a pair of scissors and sustained a small puncture,  $\frac{1}{4}$  inch in length, on the anterior surface of the left ventricle about 3 cm above the apex. The wound was closed about 3 hours after injury, complete recovery following.

W C Hunter, R R Staub and W B Lunsford (Arch Path 6 807 (Nov) 1928) report a case of a man who, while in a depressed phase of manic-depressive psychosis, plunged the aluminum tube of his pipestem through the left wall of the chest, completing the ingress of the tube by pressure on it with the rubber mouth piece. The patient succumbed 8 days later. At autopsy, a small pericardial wound near the apex of the heart was sealed off with fibrin. The pericardial sac was obliterated by an exudate, chiefly fibrinous, but with considerable admixture of clotted blood over the anterior surface of the heart. Two centimeters from the apex of the left ventricle, anteriorly and slightly to the left of the anterior interventricular branch of the left coronary artery, an aluminum tube projected outward from the surface of the heart for a distance of nearly 2 cm into the pericardial sac.

In T C Davison's case (Arch Surg 18 475 (Jan-pt 2) 1929) a 25 caliber brass-jacketed bullet was removed from an abscess cavity, containing 4 c c of pus, in the wall of the pericardium. A small rubber tissue drain was placed in the cavity and the skin closed. The patient's general condition improved, but he also had an empyema resulting from a bullet wound of the lung. He was dismissed

from the hospital on the ninety-fourth day, entirely well.

*Indirect Injury*—J W. Hinton (J A M A 93 266 (July 27) 1929) states that penetration of the heart by *needles* and similar *foreign bodies* is extremely rare. He cites a case in which an aspirating needle was broken off at the hilt while doing a diagnostic puncture for a left-sided empyema. An attempt to grasp the needle with forceps was made without success. One week later at post-mortem examination, the needle was found piercing the back of the heart and pericardium and running into the left ventricle on the posterior surface. The needle appeared to come from about 1 inch below the hilum of the left lung in the lower lobe.

The author, in reviewing the literature, quotes observations by Loison, in 1899, who found that *needles* were found in the myocardium in 23 of 223 cases of wounds of the heart. In some of these cases the foreign body was well tolerated and did not cause any definite symptoms. Meyer-Panttrin, in 1920, collected reports of 10 cases in which at necropsy a needle was unexpectedly found in the heart. They also reported 12 cases in which a needle entering the heart was the cause of death. In 1 case, the needle entered the body through the respiratory tract. In 2 cases it was swallowed and entered the heart from the esophagus. There were in 4 cases definite histories that the needle had entered from the external surface of the body and in 1 other case the circumstances indicated this mode of entry.

**DIAGNOSIS**—O. Hoche (Wien klin Wchnschr 42 644 (May 9) 1929) states that to diagnose an in-

jury of the heart, the following factors should be observed. The general condition of the patient, the character and the location of the outer wound, the kind of instrument used, and whether a hemopericardium or a hemothorax is existent. Probing of a wound is dangerous and, therefore, not advisable. Percussion may show an enlargement of the area of cardiac dullness and on auscultation a splashing sound may be heard. The x-rays are likewise often helpful. They are especially valuable for detecting a hemopericardium. However, with all these diagnostic aids, there occur cases in which it is difficult to make a diagnosis.

**TREATMENT**—*Cardiorrhaphy*—In exposing the heart for suture, W. Sudhoff (Munchen med Wchnschr 75 479 (Mar 16) 1928) used an intercostal incision, as described by Wilms, Sauerbruch, and others. This provided a sufficient view of the operative field. He used this method in 2 successful cases.

F R. Sherard, S H. Stephens and J T. Hutchens (South M J 21 452 (June) 1928) made use of a guy stitch of catgut in the muscular apex of the heart, just below the angle of an 8 mm wound in the right ventricle, to pull the heart to the left. Four chromic catgut sutures were placed in the muscle wall. The pericardial sac was closed by interrupted chromic catgut sutures.

Schoenfeld (*loc cit*) closed a wound in the left ventricle with silk sutures.

While Bates (Ann Surg 89 625, 1929) was suturing the pericardium, after having sutured a stab wound in the left ventricle, the heart stopped. Heart action was re-established by digital massage and the intravenous

administration of a 1:1000 solution of **adrenalin** in normal salt solution. His patient made a satisfactory recovery.

#### **SPONTANEOUS RUPTURE** —

G H Stevenson and A J Marshall (Glasgow M J 110 337 (Dec) 1928) report a case of rupture of the heart from a pyemic abscess in the myocardium. At autopsy, the pericardium was found distended by pus and blood from a ruptured abscess of the wall of the left ventricle, which had traversed the entire thickness of the ventricular musculature. Only 19 similar cases have been reported in the literature.

According to A B Davenport (Am J M Sc 176 62 (July) 1928), spontaneous rupture of the heart is certainly a disease of the aged, occurring most often on the anterior surface of the left ventricle. From the fact that 30 of 52 cases reviewed are known definitely to be due to coronary disease, and that 17 others present conditions strikingly resembling rupture following coronary disease, and that many of the remaining cases if carefully examined at the time of autopsy would have shown similar conditions, he believes it is safe to say that spontaneous rupture is, in the aged, practically always the result of coronary disease with infarction.

The premonitory symptoms are too varied to allow of a definite diagnosis of impending rupture. The exciting cause may be slight or violent. The survival after rupture is usually very short.

**HEART IN SURGERY**—H B Sprague (Surg Gynec Obst 49 54 (July) 1929) analyzes the result from operation in 170 cases with cardiac disease. Forty-two of the patients, 24 male and 18 female, died during or

following operation, a gross mortality of 24.7 per cent. Five of the patients died suddenly on the operating table. Age is the most important factor in mortality as two-thirds of the deaths occurred in patients over 50. In 14 dying under the age of 50, syphilitic heart disease was present in 3, rheumatic heart disease in 6 (2 with auricular fibrillation and 4 with normal rhythm), Pick's disease in 2, and hypertension, obesity plus hypotension, and unknown heart disease in 1 each. Patients with rheumatic heart disease and normal rhythm without congestive failure can be operated upon with little danger. Unless the patients have syphilitic aortitis or advanced coronary disease, sudden death during the operation is unlikely. Patients without heart lesion shown by clinical or pathological standards are more likely to die unexpectedly as the result of anesthesia than are those with demonstrable heart disease. In 42 deaths, only 22 occurred from heart disease. The presence of auricular fibrillation increased the danger of death from operation in arteriosclerotic cases only from 34 to 37.5 per cent, but in a small series of cases of rheumatic heart disease there was an increase from 8.8 to 22.2 per cent. Thyrocardiac patients with auricular fibrillation do better with operation for the thyroid hyperfunction than any other group with this arrhythmia, because of the immediately favorable effect of thyroidectomy on the heart. The analysis of Sprague is based upon patients with cardiac disease operated upon in the Massachusetts General Hospital during 10 years prior to January 1, 1928. Among the conclusions

of those who have considered the question are the following

(1) The heart cannot be considered apart from the vasomotor system, (2) the ability of the patient to carry on his daily activities without symptoms usually tells more about his myocardial power than can be discovered on examination of his heart, (3) no type of heart disease is *per se* a contraindication to necessary surgery, (4) congestive heart failure greatly increases the danger of complications and the mortality from operation, (5) medical treatment of a failing heart before operation in some cases may convert a poor surgical risk into a relatively good one, (6) obese and chronically septic patients are poor risks for operation, (7) the behavior of the respiration, pulse, and blood-pressure during and after operation is the best clinical guide to both the internist and the surgeon, (8) other things being equal, the skill of the anesthetist and the surgeon is often the determining factor in assessing to the cardiac the degree of risk of surgical procedures.

**HEART DISEASE IN CHILDREN.—INCIDENCE**—D Brewer (Arch Dis Childhood 3 277 (Dec) 1928) found that the proportion of children that can be expected to exhibit functional murmurs is about 28 per thousand, permanent organic disease about 3 per thousand, and active carditis about 5 per thousand. He concluded that 64 per thousand or 1 child in 160 reaches the age of 14 years with a permanently crippled heart. T H Coffen and H A Carey (Northwest Med 27 184 (Apr) 1928) examined 3000 school children. Of this group, 191 were found to have

heart murmurs, in 92 of these the murmurs were not apparent until after exercise. Of the 191, 15 were found in whom rheumatic heart disease was a factor. Systolic murmurs at the base of the heart, particularly over the pulmonic area, were frequently noted, but were thought to be of little significance.

**CLASSIFICATION**—Heart diseases in children may be divided into 2 main groups, congenital and acquired.

**CONGENITAL.**—Congenital heart disease does not always manifest itself by clinical symptoms. In fact, this disease may be classified by the presence or absence of symptoms, alone (M E Abbott Lancet 2 164 (July 27) 1929)

I Those of clinical significance

1. Non-cyanotic group (a) Cases in which no abnormal communication exists, but in which the defect may produce a mechanical interference, (b) cases of arterial-venous shunt with possible terminal or transient reversal of flow
- 2 Cyanotic group (a) Cases of venous-arterial shunt, (b) cases of elevated peripheral pressure

II Those without clinical significance

- 1 This group includes such cases as diverticulum of the pericardium, true dextro-cardia, and the like

**ETIOLOGY**—Alcoholism and consanguinity seem to play an important part in congenital heart disease. Syphilis seems to be of little importance as an etiologic factor (H Rosler Wien Arch f inn Med 15 487 (July) 1928)

**Heart Block**—A congenital defect in the formation of the heart which interferes with the conducting system is considered by G Nicolson, H I. Shulman and D L Green (Am J. Dis Child 37 580 (Mar) 1929) to be the most common cause of permanent heart block in the child. The condition is usually discovered because of the presence of bradycardia, and a loud systolic murmur heard best over the precordium. Neither the bradycardia nor this murmur is pathognomonic, and either or both may occasionally be absent. The lesion is probably above the bifurcation of the bundle of His. C B Leech (Am J Dis Child 39 131 (Jan) 1930) reported a case of congenital complete heart block with an associated patent ductus-arteriosus.

**COMPLICATIONS**—*Endocarditis*—Congenital heart disease not infrequently predisposes to endocarditis, according to M G Wilson, C Lingg and G Croxford (Am Heart J 4 164 (Dec) 1928). Approximately one-third of the children with this type of defect subsequently develop rheumatic infection. A B Marfan (Nourisson 15 329 (Nov) 1927) detailed a case in a young infant at whose necropsy there was found a 3-chambered heart, due to absence of the interventricular septum, a vegetative endocarditis of unknown etiology, covering the mitral and tricuspid valves, was present. G Kaufmann (Am J Dis Child 37 672 (Nov) 1929) reported the interesting occurrence of congenital heart disease and fetal endocarditis in twins. According to the history, the mother had had an ulcerated tooth and a streptococcic sore throat during pregnancy.

### ACQUIRED.—ETIOLOGY.—

Acquired heart disease is divided by H F Swift (Am Heart J 3 629 (Aug) 1928) into 2 types, infectious and degenerative. The former seems to occur most commonly in the first 4 decades of life and the latter during a later period. *Diphtheria* produces the simplest form of cardiac injury, which, toxic in origin, is characterized by a waxy hyaline or fatty degeneration of the muscle fibers. The conduction system of the heart is also frequently involved in the disease. *Scarlet fever* cardiac complications, although comparatively infrequent, may be classified as (1) toxic, resembling the findings in diphtheria; (2) allergic, characterized by verrucose endocarditis, (3) septicopyemic, a form of malignant endocarditis. *Rheumatic carditis*, according to Swift, seems also to be an allergic manifestation. For *specific cause* of rheumatic carditis, see CHOREA.

*Rheumatic Carditis*—Rheumatic disease is the most common etiologic factor in heart disease in childhood. It is observed in children as a general infection, its course is characterized by frequent periods of activity, especially during the first 3 years after the onset, following which there is a diminishing number of recurrences. After the age of 12 years, immunity, or something akin to it apparently develops. The age periods under 3 and from 10 to 14 years appear to be ones of particular vulnerability as judged by the rate of mortality, and by the increased activity of the disease. The clinical course is in marked contrast to that in children with non-rheumatic heart involvement, in whom the same physical signs, without pro-



gression, are present over a period of years

*Auricular fibrillation* has been considered as an unusual type of irregularity in children during the course of rheumatic fever. S. P. Schwartz and M. M. Weiss (Am J Dis. Child 36: 22 (July) 1928) in a group of 60 children with rheumatic heart disease, discovered that 10 of them developed auricular fibrillation. Auricular fibrillation may be (1) paroxysmal, (2) terminal or (3) chronic in type. Mitral stenosis, acute rheumatic fever, and excessive administration of digitalis are all causative factors. The *prognosis* in children with this form of irregularity is grave.

*Sub-acute Bacterial Endocarditis*—Swift (*loc cit*) suggested that, in general, sub-acute bacterial endocarditis is accompanied by a state of relative tissue immunity. This type of infection is a rare condition in childhood. G. M. Lawson and R. S. Palmer (New England J Med 199: 1205 (Dec 13) 1928) have reviewed the records at the Massachusetts General Hospital and have found 3 definite instances in children aged 6, 8 and 10 years respectively, and 1 more instance in a child of 21 months, of streptococcus viridans septicemia, without demonstrable valve lesions.

*Cardiac failure*, as a result of physical exertion *per se* apparently does not occur, according to W. St. Lawrence (J A M A 89 2235 (Dec 31) 1927). Cardiac decompensation in children, is believed to be due to actual active infection in the heart. Fever is practically always present in cardiac failure in childhood. Edema in cardiac failure may be of 2 types. The first is the dependent type seen most commonly in the chronic varieties of in-

volvement of the heart. The second type is generalized and is not unlike that associated with nephritis. The first type is due to circulatory failure. The second type, characterized by generalized edema is apparently of toxic origin and may be a protective mechanism since the removal of the edema is often followed by fever and by toxic symptoms.

*Idiopathic Hypertrophy*—Idiopathic enlargement of the heart is one of the entire organ, or parts of it, which cannot be explained on a congenital or acquired pathologic basis. When myocardial infiltration or degeneration occurs, the case cannot be considered one of true idiopathic enlargement. While 34 cases of this type in infancy and childhood have been reported, only 17 should be included in the true idiopathic group.

**DIAGNOSIS**—*Electrocardiography*. J. M. Lichty (Pennsylvania M J 32 751 (Aug) 1929, Am Jour Dis Child 37 1328 (June) 1929), in spite of certain objections to its employment in children, found electrocardiographic study to be of definite value. Of 100 children with heart disease, 31 per cent showed significant abnormalities. Of the various clinical groups, the congenital one showed approximately 50 per cent abnormal readings. The group with late mitral stenosis and mitral stenosis with pericarditis, showed 33 $\frac{1}{3}$  per cent, the group with mitral insufficiencies and that group in which diagnosis had not yet been made showed 25 per cent each.

**PROGNOSIS**—Patients belonging to the non-cyanotic group of congenital heart disease have been found by M. E. Abbott (*loc cit*) to have relatively good expectancy of life in

contrast to those of the cyanotic group. Patients in the former group, however, are particularly susceptible to endocarditis. *Auricular fibrillation* occurring in children with rheumatic carditis usually signifies a grave prognosis, particularly when complicated by pulmonary edema. In *rheumatic heart disease*, the degree of heart involvement apparently is related to the number of attacks of carditis. The earlier the age at the onset of infection, the greater will be the number of recurrences. In the series of children with heart disease studied by Wilson *et al* (*loc cit*), 12 per cent died. Eighty-eight per cent of the deaths were due to rheumatic heart disease. The most common age at which death occurred was between 11 and 12 years.

S. Amberg and F. A. Willius (M. Clin. North America 12: 1535 (May) 1929) consider that complete disappearance of all clinical signs of valvular lesion, does not necessarily imply that the heart is anatomically perfect. However, it is probable that in children complete recovery from undoubted organic disease is not rare.

**PROPHYLAXIS**—Every child with a rheumatic diathesis should be under observation. The cardiac clinic should provide for the pre-cardiac child. Much good can be done in the pre-cardiac stage, that is, when the child has suffered some heart disabling illness without actual destructive changes. Special care must be given to the heart in every illness which increases its rate or disturbs its rhythm. (J. Epstein, M. J. and Rec. 126: 298 (Sept. 7) 1927.)

**Tonsillectomy**—A. D. Kaiser (J. A. M. A. 89: 2239 (Dec. 31) 1927), from

an analysis of a large series of cases, concluded that the tonsillectomized child not yet infected has a decidedly better chance to escape rheumatic infection than the child of the same age whose tonsils have not been removed. Recurrent attacks also were found to be less common in the group in which tonsillectomy has been performed than in the control group. M. G. Wilson, C. Lungg and G. Croxford (*loc cit*) found that the age at which tonsillectomy was performed, and not the fact of tonsillectomy, appeared to be the significant factor in the incidence of non-recurrence of infection after operation. These investigators concluded that the routine removal of tonsils for the prevention of rheumatic heart disease in children, is not based on conclusive evidence.

**TREATMENT—Exercise**—Fever in a child with cardiac disease not explained by infection elsewhere in the body must be attributed to a focus in the heart. After the temperature has remained normal for 10 days, rapid headway can be made. At first these children are treated as patients convalescing from any severe infection, being allowed, in increasing periods, out of bed, and later, beginning with a few steps, more and more exercise is allowed until they can go about the room. The exercise tolerance tends to increase rapidly, and before many weeks most children are able to pursue the activity of the normal child.

From the standpoint of functional capacity children with cardiac involvement tend to divide themselves, according to St. Lawrence (*loc cit*), into 3 groups. Class 1, those with a normal exercise tolerance who are able to pursue the physical activities

of normal children, class 2, those with a diminished exercise tolerance, who suffer from an excessive circulatory reaction for the work performed, class 3, those with severe cardiac failure whose hearts are unable to efficiently meet the circulatory needs at rest in bed, and hence have no exercise tolerance

Children in class 1 are permitted all types of exercise, until they become conscious of moderate dyspnea and palpitation. About 25 per cent of the children with cardiac involvement on so-called recovery from severe infection, will continue to exhibit an excessive circulatory reaction to exercise (Class 2). The diminished exercise tolerance is not always due to the cardiac condition, but may be caused by such factors as anemia, undernutrition, lack of adequate exercise, or foci of infection elsewhere in the body.

*X-ray*—R. L. Levy and R. Golden (Am Heart J 4 127 (Dec) 1928) asserted that in certain cases of *rheumatic carditis*, x-ray irradiation of the heart appeared to exert a favorable influence. They believe it is possible that in patients having their first attacks of rheumatism, with or without evidence of cardiac involvement, irradiation may be useful in minimizing the danger of damage to the heart.

**HELIOOTHERAPY** See LIGHT THERAPY AND HELIOOTHERAPY

**HEMATURIA.**—The etiology of hematuria is varied and some of the unusual cases are as follows:

F. Bilger (J d'urol 24 294, 1927) reports a case of hematuria due to varicocele varices, associated with

pelvic varicocele, with complete cure after operation.

E. Podvinec and W. Pollak (Monatschr f Kinderh 43 480 (June) 1929) report hematuria in a 3 year old child, with influenza, whose bladder showed numerous hemorrhagic areas.

H. H. Haft (J A M A 90 742 (Mar 10) 1928) reports hematuria as a predominating feature in shoe dye poisoning.

Hematuria with hydronephrosis has been reported by C. N. Swanson (J A M A 93 1551 (Nov 16) 1929) during pregnancy.

I. Gray (New York State J Med. 29 139 (Feb 1) 1929) has seen hematuria during alkaline therapy for heartburn which he believes was urethral in origin, due to an irritation produced by the passage of a highly concentrated phosphatic urine.

L. Strominger (J d'urol 27:11 (Jan) 1929) has seen recurrent hematuria with stricture of the urethra.

A. V. Neale (Brit M J 2 442 (Sept 8) 1928) and D. M. Stern (Practitioner (Oct) 1929) have seen hematuria during insulin treatment.

The most frequent cause of hematuria was found by J. B. Wear and I. R. Sisk (Wisconsin M J 28 417 (Sept) 1929) to be tumors of the bladder, and the next most frequent, pyelonephritis, which was observed in 83 cases by cystoscopic examination.

As to the non-surgical causes of hematuria, Thomas Horder (Brit. M J 1 993 (June 4) 1927) finds acute nephritis far the most common disease associated with it.

In chronic nephritis bleeding may occur under 2 conditions (1) Chronic parenchymatous nephritis, *i e*, tubal nephritis with considerable edema, a

tendency to chronic uremic symptoms and not marked cardiovascular changes and subinfection, and (2) so-called chronic interstitial nephritis, granular kidney, or contracted kidney, with high blood-pressure and marked cardiovascular changes, not associated with subinfection. It is sometimes said that syphilitics tend to a hemorrhagic type of nephritis if the kidney is affected.

**TREATMENT.**—Wilhelmi (J. Missouri M A 25 468 (Oct) 1928) states that hematuria should not be treated expectantly because frequently inflammatory conditions of the bladder are caused by infections higher up. *Cystoscopy* and *pyelography* should be employed early to determine the cause of the bleeding. V Blum (Wien klin Wchnschr 41 1683 (Dec 6) 1928) states the therapy should be based on the diagnosis. Profuse bleeding which would surely make the patient anemic, requires surgical intervention and possibly transfusion. Bleeding from the kidneys should be treated surgically if the common remedies, such as rest, restricted diet and cold applications prove ineffective. He also advocates the use of medicaments and injections.

**HEMOCHROMATOSIS.**—**DIAGNOSIS**—The diagnosis is usually difficult and in most of the reported cases was made post-mortem. P M Krall and A M Ginsberg (J Kansas Med Soc 30 155, 1929) report an unusual case with autopsy findings in which no pigmentation of the skin was noted. Diabetes mellitus and probable brain abscess were diagnosed. Autopsy disclosed hemochromatosis with extensive deposits of hemosiderin in the liver, kidney,

pancreas and other organs. The liver was cirrhotic.

**ETIOLOGY.**—E H Funk and H. P. St Clair (Trans Assoc Amer Phys, J A M A 92 2189 (June 29) 1929) found 140 mg ( $2\frac{1}{6}$  grains) of copper per kilogram ( $2\frac{1}{8}$  pounds) of liver tissue in one of their cases. In view of the possible etiologic relationship between chronic copper poisoning and hemochromatosis, cooking in copper kettles, etc., may be deprecated. On the other hand, chemical studies of the liver with the idea of obtaining purified products for the treatment of pernicious anemia, have shown that copper is an essential if the liver extract is to be effective. Possibly there is an equilibrium between iron and copper, and upset of this balance in the direction of copper produces hemochromatosis.

**HEMOGLOBIN.**—Obviously, the size of red blood cells is determined to some extent by the amount of hemoglobin contained. *Vice versa*, the amount of hemoglobin will determine the size of the cells. The work of Price-Jones of some years ago concerned itself with measurements of the diameter of the red cells. But the thickness is also variable. Wintrobe, taking this into consideration, has determined that the red blood cells of normals vary in their volume between 70 and 98  $\mu$  in size. They contain  $287 \times 10^{-12}$  Gm of hemoglobin, occupying about  $33\frac{1}{3}$  per cent of the substance of the cell.

Determinations in various conditions will probably bring out points of interest and value. For instance, M M Wintrobe (Am J. M Sc 177 513 (Apr) 1929) found an increase

in the volume of the red blood cells in *pernicious anemia*, but the increase in the amount of hemoglobin in them is never as great as this increase in their volume

**HEMOGLOBINURIA.**—The term *paroxysmal hemoglobinuria* is a misnomer, according to A. M. Puris (Am J Dis Child 37 1027 (May) 1929), because, he says, the condition can always be reproduced by a special set of circumstances. Thus, chilling and cold lead to its occurrence. Donath and Landsteiner's demonstration (in 1905) that an auto-hemolysin is developed which destroys the patient's own blood cells, is cited by Puris. The Wassermann reaction is often positive at the time of attacks. Syphilis has long been held responsible for the disease and appropriate treatment for this sometimes brings about a cure of the hemoglobinuria. On the other hand, may not other infections at times produce the same results?

I. C. Hall (J Infect Dis 45 156 (Aug) 1929) isolated a *Bacillus Sordelli* from cattle having icterohemoglobinuria. The organism is closely related to the *Bacillus hemolyticus*.

The association of hemoglobinuria and urticaria arising from cold is noted by several observers.

**HEMOPHILIA.**—M. T. Macklin (Am J M Sc 175 218 (Feb) 1928) has written a very interesting paper on the hereditary aspect of hemophilia, from which the following conclusions may be drawn: (1) A man afflicted with hemophilia will have no offspring with the disease provided he marries a normal woman who is not a carrier. (2) The sons of such a man will be normal and cannot trans-

mit the disease. (3) The daughters will be outwardly normal but will transmit to half their sons this disease. (4) One-half of the daughters of a woman who is a carrier will transmit the disease to one-half their sons and one-half their daughters who will be carriers. (5) Theoretically, a woman may be a hemophiliac providing her father showed the disease and her mother was a carrier. This is probably not an actuality, as a double quantity of the defect may act as a lethal factor inhibiting the development of the embryo.

J. W. Pickering (Lancet 1·1239 (June 15) 1929) relates the experience of using liver and liver extract orally for the benefit of hemophilia. Several indications led him to believe the liver is effective. Fibrinogen is formed in the liver and hepatic injury or insufficiency soon causes a loss of it in the blood. The use of Eck's fistula demonstrated the formation of prothrombin in the liver. From his experiments with liver he was able to demonstrate in the liver parenchyma, the presence of a substance which is essential for the rapid clotting of the blood.

**TREATMENT.**—P. Ziegelroth (Munchen med Wchnschr 75 133 (Jan 20) 1928) reports 2 cases of hemophilia in which he used lacto-vegetarian diet, also foods which were eaten in their natural condition. Eggs were consumed raw and honey was substituted for sugar. Possibly by such improvement in the calcium metabolism, there will be a comparable improvement in the blood clotting time.

E. Palmieri (Policlínico (sez prat) (Sept 24) 1928) cites a case in which sodium citrate acted as a hemostatic

after all others failed. He claims it must be prepared fresh and should be injected intravenously very slowly.

A Barsottelli (*Arch de med cir y espec* 29 624 (Dec 1) 1928) demonstrated by his investigation that in increasing the coagulability of the blood, the calcium content increases and the potassium content decreases. The greater the increase in the calcium, the greater the decrease in potassium occurs but the 2 do not counterbalance each other.

In hemorrhagic conditions post-operatively seen in biliary tract diseases, E Sertert (*Zentral f Chir* 56 66 (Jan 12) 1929) ascribes the bleeding to a lack of bile in the intestine. When the icterus is of brief duration, the coagulation time is normal. When the icterus is prolonged, the coagulation is also prolonged. Thinking the lack of vitamin D is an important factor, the author advocated the **artificial heliotherapy** before operation until the coagulation time is normal which usually takes about 2 weeks.

W W Payne and R E Steen (*Brit M J* 1 1150 (June 29) 1929) believe there is no known agent which has a permanent effect in hemophilia. Protein-induced shock causes a period of hypercoagulability followed by one of hypocoagulability. The only treatment that was found to be of value was the intravenous injection of either **citrated whole blood** or **citrated human plasma**. Given intraperitoneally or intramuscularly, these agents are without effect.

#### HEMOPTYSIS.—DIAGNOSIS—

In hemoptysis of obscure origin, Maurice Davidson (*Lancet*, 1 122 (Jan 15) 1927) suggests the following examinations when the ordinary

causes have been ruled out (1) The complete clinical examination, (2) x-ray examination, (3) reexamination by x-rays after introduction of lipiodol, and (4) bronchoscopy.

C Baumler (*Klin Wchnschr* 8 1493 (Aug 6) 1929) reviews 4 cases of latent tuberculosis of the apex of the lung. In all 4 patients, over-exertion led to sudden death. From his observations, the author draws the following conclusions (1) Hemoptysis in otherwise healthy appearing persons always indicates tuberculous processes in the apex of the lung, particularly in the right lung. (2) Patients who are affected in this manner should be warned against excessive bodily exertions such as running, dancing, mountain climbing and strenuous sports.

Hemoptysis associated with segmental hyperalgesia has been reported by A I G McLaughlin (*Lancet* 1 116 (Jan 19) 1929), who feels that it may be considered an early sign of non-excavated inflammatory lesion in the lung. The situation of the hyperalgesia definitely indicates the side and site of the lesion. Apical lesions are connected with the third and fourth and occasionally the fifth dorsal segments of the spinal cord, whereas basal lesions are associated with the fifth, sixth and seventh, and occasionally the eighth, dorsal segments. The hyperalgesic areas are invariably situated, both anteriorly and posteriorly, close to the midline of the body, but those due to basal lesions are placed about  $2\frac{1}{2}$  inches more laterally than the apical areas.

**TREATMENT**—Calcium chloride has a place in the treatment of pulmonary hemorrhages, according to A

J. Bondurant (U S Vet Bur M Bull 5 695 (Sept) 1929)

Extract of pituitary posterior lobe has been used by A. Jacquelin (J. méd. franc 17 51 (Feb) 1928) in pulmonary hemorrhages of moderate intensity, injecting 1 c c every 2 or 3 hours, when no urgent indication exists for the use of larger amounts, on the following days he injects 1 ampoule, mornings and evenings. In very abundant hemorrhages, the pituitary extract is given intravenously very slowly. Hydrochlorate of emetin is also suggested by the same author.

Epinephrine injected into the supraglottideal region has been reported by M. Ascoli (Brit M J 1 549 (Mar 23) 1929). The injection is made so that the drug is distributed along the bronchial surface of the affected area. The hemorrhage usually stops at once, the method having failed in only 6 out of 100 cases. Repeated injections may be made as often as every 6 or 8 hours.

F. Giuffrida (München med Wchnschr 75 302 (Feb 17) 1928) also reports satisfactory results from direct instillation of adrenalin into the trachea. The solution used was 1 c c of the 1:1000 solution diluted with twice as much water in order to provide a volume sufficient to spread over a considerable area in the bronchial tree.

Adhesive plaster has been found useful by W. Knoll (Schweiz med Wchnschr 58 799 (Aug 11) 1928). Overlapping strips, 5 cm wide, are applied over the costal arch of the diseased side, as in rib fractures, from the middle of the sternum to a little beyond the spine. The breast and axillary cavity are protected with

wadding. The upper strip must not be so high that when the arm is lowered, pressure is exerted on the organs of the axillary cavity (danger of paralysis). The lower lobe is thus put at rest as far as beneath the axilla. One or two strips are now applied over the shoulder from the middle of the scapula to about the third rib. The clavicle must be padded. Another horizontal strip is applied to keep this strip from loosening. The entire dressing must be applied in deepest expiration. The prevention of excursion of the lower lobe thus effected acts also to diminish the movement of the diaphragm.

Artificial pneumothorax is the most effective of all forms of treatment is the opinion of Victor Randolph (Southwestern Med 11 208 (May) 1927).

**HEMORRHOIDS.—TREATMENT.**—According to B. Eldering (Deutsche med Wchnschr. 54 569 (Apr 6) 1928), Boas's method of treating hemorrhoids with alcohol injection does not possess the advantage over cauterization that is claimed. He believes it unsafe for ambulant cases.

A. S. Morley (Lancet 1 543 (Mar 17) 1928) injects a 20 per cent solution of carbolic acid in equal parts of glycerin and water or he advises a 5 per cent solution of phenol in almond oil by submucous injection and not into the pile mass. The quantity into each pile is usually from 1 to 2 c c (16 to 32 minims). The injections are continued at intervals of from 5 to 7 days until each pile is of parchment-like hardness from its upper extremity to the muco-cutaneous junction.

For the conservative treatment of

hemorrhoids Hellmuth Unger (Munch. med. Wchnschr 76 1637 (Sept 27) 1929), stresses the importance of a diet leaving little residue. He advises first perfect cleanliness and secondly application of suppositories such as one containing bismuth oxychlorate, zinc oxydate, adrenaline hydrochloride (1:1000), eucaine hydrochloride and menthol.

The injection treatment of hemorrhoids is considered preferable to the operative method by V. Meisen (Acta Chir. Scandinav. (Nov 22) 1928). It is gentle, painless and requires no anesthesia nor a stay in the hospital. He uses a 50 per cent dextrose solution, but reserves the 25 per cent sodium salicylate solution (3 to 5 cc—48 to 80 minims) for use in the main trunks. V. Meisen (Ugeskr. f. Laeger 90 523 (June 7) 1928) also advocates a solution of quinine chloride 0.5 cc (8 minims), methyl urethane 0.25 cc (4 minims), distilled water 2 cc (32 minims), in ampules. In the case of internal hemorrhoids the danger of necrosis is greater and the technic more difficult. Of 100 cases treated, 28 occurred in women and 72 in men. The average number of injections was 3. The greatest number was 13 and the least was 1. An acute attack of hemorrhoids contraindicates the injection treatment [An acute attack usually means that thrombosis is present—ED].

W. A. Rolfe (New England J. Med. 198 187 (Mar 15) 1928) describes the use of injections of quinine and urea hydrochloride in the treatment of internal hemorrhoids [The quinine and urea solution was first advised by Dr. E. H. Terrell of Richmond, Va.—ED]. Care is needed in the selection of cases. Strangulated,

sloughing or external hemorrhoids should not be treated by this method, and sphincteric spasm denoting infection in the ano-rectal region is also a contraindication. Treatment should consist of 6 to 8 injections at 5 or 6 days' interval. Into the center of each pile 5 to 15 minims (0.3 to 0.9 cc) of the solution are slowly injected. Such injections should be made well above the ano-rectal line, otherwise painful edema may result.

**Sclerosing Injections**—From 1921 to 1927 R. Bensaude and P. Oury (Presse méd. 36 706 (June 6) 1928) made 2753 sclerosing injections in 325 persons with hemorrhoids. Cure was noted in 49 per cent of the cases, amelioration in 47 per cent and no improvement in 4 per cent. In using the sclerosing treatment in one sitting, V. J. Bellot (Arch. de méd. et pharm. nav. 118 237 (July-Sept) 1928) reports his experience with the quinine and urethane method of treatment, which he has used with success in more than 250 patients. He makes interstitial injections, by means of a graduated glass syringe with a short thin needle. After the usual preparation of the patient, the anal region is disinfected with a dilute solution of iodine, so as not to cause any injury to the mucous membrane. After it is dry, cupping is done with the ordinary cupping glass to exteriorize (Boas) any internal hemorrhoids. Then the quinine and urethane injections are made into the hemorrhoids. Bellot also injects those which appear cured and sclerotic but which may still be active. To prevent recurrence it is also important to sclerose tissue which had previously appeared normal but in which after cupping a bluish discolor-



ation was seen. Bellot administers from 25 to 75 mg ( $\frac{1}{3}$  to  $1\frac{1}{6}$  grains) of extract of opium to maintain constipation for 4 days. After this time, stools may be allowed to pass. He states that rapid action is essential in giving the treatment, with care not to retrace the steps on giving the injections. His results were as successful in prolapse and in aged persons as in younger ones.

G. Cotte (Lyon méd. 143 153 (Feb 10) 1929) reports 2 cases of large confluent hemorrhoids with prolapsus recti, cured by diathermo-coagulation under local anesthesia without dilation of the rectal sphincter. He believes that diathermy alone is only palliative. It has analgesic, and antispasmodic effects, but should not be used in cases of hemorrhoids, fissure, prolapse, in acute inflammatory or thrombotic complications.

Surgical diathermy is regarded by W. Bierman (Physical Therap 45 28 (Jan) 1927) as superior to excision, ligation or clamp and cautery. He uses the mono- or bi-polar current, depending on the extent of the areas to be destroyed and employs an electro-surgical clamp. After anesthesia, the internal or external hemorrhoids, whichever the case may be, are grasped by means of an Allis forceps and the hemorrhoidal clamp applied to the base. The current is turned on by means of a foot switch and the hemorrhoid becomes coagulated. This is then cut off with scissors or by means of the high frequency cutting current. The author feels that this method is superior to the ordinary clamp and cautery in that the cauterization is not superficial but occurs within the tissues embraced by the electric clamp.

The ambulatory operative treatment of hemorrhoids is discussed by J. Jensen (Ugeskr f Laeger 91.419 (May 16) 1929) who contends that conservative measures disprove the common belief that external hemorrhoids are necessarily an indication for an operation. He states that only internal hemorrhoids require operative treatment and then only after acute symptoms have disappeared. His surgical treatment is that of a modified Whitehead operation, carried out under local novocaine-adrenaline anesthesia after a hypodermic of morphine. The patient is taken home in an ambulance after the operation and subsequently visited by a nurse or a physician.

T. H. T. Barber (Brit M J 1 397 (Mar 2) 1929) recommends a local anesthetic in the surgical treatment of hemorrhoids composed of procaine 0.005 Gm ( $\frac{1}{12}$  grain), epinephrine (1:1000) 24 minims (1.5 c.c.), and physiological solution of sodium chloride, 100 c.c. ( $3\frac{1}{3}$  ounces). Small pledgets of cottonwool tied in the middle by a linen thread are soaked in 15 to 20 c.c. ( $\frac{1}{2}$  to  $\frac{2}{3}$  ounces) of the solution and introduced into the anus. The anus is then cleansed and painted with tincture of iodine. Injections, 6 to 8 in number, are made along the muco-cutaneous junction so as to encircle the anus. The total quantity is 30 to 40 c.c. (1 to  $1\frac{1}{3}$  ounces). The cottonwool is removed and the forefinger is inserted into the rectum, the internal sphincter is hooked and drawn down. The sphincter is then encircled with 6 to 7 injections equal to 30 to 35 c.c. (1 to  $1\frac{1}{6}$  ounces) of the solution and anesthesia should be complete.

**HERNIA. — FEMORAL — TREATMENT.**—G. Marchetti (Clim chir 32 779 (July) 1929), in operating for the third time for a recurrence of an enormous right femoral hernia, decided to combine the series of methods by Ruggi and Parlavecchio by fixing as high as possible the pedicles of the sac and by suturing to the posterior margins of the ring a strong layer that would lead to obliteration of the ring itself and the internal side of vessels of the femoral canal. To accomplish this, the inguinal root was employed, which enabled him to ligate the sac high up and also to suture it. By these combined methods Marchetti has obtained results when others have failed.

**OMENTAL BURSA**—Herniation of the small intestine through the transverse mesocolon in the omental bursa and then the hepatico-gastric ligament into the peritoneal cavities has occurred a number of times as a late complication of gastro-enterostomy. The accident demonstrates the extreme importance of careful suture of any transmesocolic opening in a gastro-enterostomy or other abdominal operations. H. Godard and P. Smith (Rev de chir 67 265 (Jan 9) 1929) find that the prognosis is more favorable in hernia through the mesocolon. Their occurrence after gastro-enterostomy is very frequent, on the other hand, hernia through the foramen of Winslow constitutes the extreme danger, because of the rapidity of incarceration and the difficulty of operation. Godard and Smith's patient was a man aged 34 years, upon whom a gastro-enterostomy had been done 3 months previously on account of severe pain in his stomach. X-ray examination showed a pyloro-duo-

denal stasis and a duodenal-jejunal flexure reaching as far up as the lesser curvature. When the abdomen was re-opened, almost the entire small intestine was found lying on the stomach, omentum and transverse colon, hernia having occurred through the mesocolon into the omental bursa and then through the hepatico-gastric ligament into the peritoneal cavity. The hernia was reduced and traction on the small intestine released, after which the intestine was again aspirated into the omental bursa, demonstrating the extreme importance of careful suturing of any transmesocolic opening due to operation.

**HERPES SIMPLEX.—ETIOLOGY**—According to Gildemeister and Heuer (Deutsche med Wchnschr 55 905 (May 31) 1929) experiments made on rabbits show that the virus of herpes spreads through the organism mainly by way of the nervous system. Doene, Voelchting, Ligrist (quoted by J. Jacous in Riforma med (Apr 2) 1928) conclude that the disease does not remain localized but can produce a serious general infection (fever, intestinal or nervous symptoms and encephalitis).

Virus can also be inoculated through the cornea, skin, mucous membrane, nerve trunk, testicles, lung and blood stream.

Animals surviving the infection show a certain immunity against new infection.

Zinsser and Tang (J Immunol 17 343 (Oct) 1929) deal with survival of herpes virus *in vitro* in the presence of a free supply of oxygen, and under conditions in which oxygen is completely removed by the addition of a reducing agent and a petro-

latum seal Their experiments show that the virus can be preserved for a greater time under conditions of anaerobiosis They were unable to cultivate the virus They further conclude that in a considerable percentage of human beings, neutralizing serum constituents against herpes virus develop in the course of years

P Gastinel and J Reilly (Bull méd 42 839 (July 25) 1928) show by experimentation on a guinea-pig that herpes virus may remain latent in an organ without symptoms

**HERPES ZOSTER.—ETIOLOGY.**—H Freund (Arch f Dermat u Syph 155 282, 1928) reviews the literature dealing with the finding of a virus capable of producing corneal reaction and encephalitic symptoms in rabbits and concludes that in true zoster as distinguished from herpes simplex, the presence of *this* virus cannot be demonstrated He regards this as a proof of a fundamental difference between the two processes

Stephen Bézi (Centralbl f allg Path u path Anat, vol 46, Suppl 1929) reports fibrino-purulent and hemorrhagic inflammation in the Gasserian ganglion of a fatal case He believes that the diplococci found were carried by the blood stream and not extended by contiguity from the skin

The relation of herpes zoster to chicken-pox suggested by Bokay in 1888, is again considered by N Gray Hill (Brit J Child Dis 26 193 (July-Sept) 1929), who regards the two diseases as infectious and etiologically much alike He reports (Brit M J 2 197 (Aug 4) 1928) a series of cases showing that herpes zoster may give rise to an outbreak of varicella

but that a previous attack of varicella afforded no protection against subsequent attacks of herpes zoster.

**TREATMENT.**—G Milian (Paris méd J 19 74 (Jan 19) 1929) cites 5 cases in which there was a complete disappearance of the severe pain of herpes zoster within 4 hours after hypodermic injection of **neoarsphenamine**

Ultra-violet ray, auto-hemotherapy and x-ray have also been successfully employed in the treatment of zoster **Zinc oxide** starch dressings usually relieve the local symptoms A 5 per cent **anesthesin** ointment is advised in the more painful cases In gangrenous herpes zoster, Burow's solution is often helpful The anti-neuralgics and the opiates are indicated, the choice depending on the severity of the the symptoms

**HIP-JOINT DISEASE.** See JOINTS

**HISTAMINE TEST.**—Histamine is a powerful vaso-dilator which has been isolated from practically every tissue of the body The organs containing the largest amounts are the lungs Probably the substance as elaborated has no influence while it remains within the cells, but exerts its effects when the proper stimuli release it into the tissue fluids, whereupon it produces its vaso-dilator results Perhaps anaphylaxis is due in part to a release of histamine At any rate, it has pronounced effect on various processes (H H Dale, Lancet 216 1233 (June 15) and 1285 (June 22) 1929 ) N P Nechoroschew (Ztschr f d ges exp Med 66 728, 1929) found that enteral administration caused motor and secretory changes in the stomach and intes-

tines of dogs. Since it is a powerful stimulus to gastric acid secretion, a standardized procedure has been devised to study gastric secretion.

**ALCOHOL-HISTAMINE GASTRIC SECRETION TEST.**—The **TECHNIC** as used at the Lankenau Hospital, Philadelphia, is as follows. A tube is passed into a fasting stomach and the contents of the organ are withdrawn and saved. Seventy-five to 100 c.c. of 7 per cent alcohol are injected through the tube. The first specimen is withdrawn 20 minutes after the alcohol feeding and the second specimen 20 minutes thereafter. If hydrochloric acid is present in the second specimen, a third specimen is withdrawn 20 minutes later. If free hydrochloric acid is not present, 0.1 mg. of histamine is injected intramuscularly and a final specimen withdrawn 20 minutes later and examined for acid.

**HODGKIN'S DISEASE.**—Hodgkin's disease as described in the texts has become a fairly well known condition. Beginning in the lymph nodes of the neck, it spreads slowly but surely to others. It seems, therefore, that in a discussion of the disease at this time, attention should be paid rather to the exceptional cases which begin in atypical places and behave otherwise in atypical ways.

**VARIETIES**—Much literature has accumulated on the intra-thoracic variety, a number of cases beginning in the mediastinum and then followed by other growths, a number of cases began and ended in the mediastinum, death often occurring from compression of the heart and great vessels.

The cutaneous form and cutaneous manifestations of a more generalized

variety have both been discussed. According to Louste and Lévy-Frankel, the skin pictures may be those of exanthemata, erythrodermia, diffuse and localized infiltrations. Diagnosis is by biopsy. H. E. Miller (Arch. Dermat. and Syph. 17: 156 (Feb.) 1928) reports 4 cases, emphasizing difficulties of diagnosis and hopelessness of therapy.

Bone involvement also occurs, even preceding lymph node growth by several years. In the spinal column, it has compressed the spinal cord, in other situations it has caused bone pain, neuritis, and peripheral palsies.

The intestinal and gastric forms have been reported. In A. Szenes's cases (Ztschr. f. Geburtsh. u. Gynak. 96: 121, 1929) the involvement was of the internal female genitalia and the bladder. Many cases reported were in children under 15 years of age.

As far as **ETIOLOGY** is concerned, the possible relationship to tuberculosis has repeatedly been suggested. E. S. l'Esperance (J. Immunol. 15: 123 (Mar.) 1928) has evidence pointing to the avian tubercle bacillus as the cause.

The **DIAGNOSIS** is made usually on histological grounds from tissue obtained by biopsy. The pathologist is quite familiar with the 4 criteria on which the diagnosis is based, *viz.*, endothelial hyperplasia, fibrosis, eosinophilia and the presence of polynucleated giant cells. But the disease is chronic in its course and often no one piece will show all of these characteristics. For example, the older the lymph node, the more fibrosed it will be. Therefore, several pieces taken from lymph nodes in different stages of the disease may be neces-

sary for a complete picture and thus an accurate diagnosis

**PROGNOSIS.**—While Hodgkin's disease usually runs a chronic course of from 2 to 5 years, cases are reported in which extraordinary growth of lymph nodes took place and was fatal in 6 months. Also slow and rapid growth in alteration has been reported.

The **TREATMENT** remains as unsatisfactory as ever. W B Coley (Ann Surg 88 641 (Oct) 1928) finds that treatment with x-rays and radium and with toxins at least prolong life.

**HOMEOSTASIS.**—The trend to the maintenance of uniformity of physiological state is designated as homeostasis. The analysis of the factors concerned has been made in principle by W B Cannon (Physiol Rev 9 399 (July) 1929). A chief proposition is that if a state remains steady, it does so because any tendency towards change is automatically met by increased effectiveness of the factor or factors which resist the change. An enumeration of some of the factors is apropos. There is, for instance, the salt-protein content of the blood which aims, and mostly with success, to maintain that hydrogen-ion concentration of the circulating fluids which is the optimum for the cellular activities of life. There is the regulation of the dextrose supply for energy purposes through glycogen storage in the liver to be released by glycolysis slowly for ordinary needs, and rapidly in emergency. Contributory is the adrenal participation and sympathetic nervous system stimulation. There are the circulatory reactions to heat and cold

tending to keep the body temperature constant, again mediated through neural stimulation of heat and cold receptors in the skin. And, as a final example, there are the shifts in respiration rate with rest or exacerbation of muscular activity, which serve as helps in the regulation of the carbon dioxide content of the blood.

Cannon has pointed out, and revealed by experiment, the significant rôle the sympathetic nervous system plays in the maintenance of homeostasis and how the hormone epinephrine participates in the sum total of the reactions. Nature has provided man with a complicated interlocking group of regulatory systems, the purpose of which is to assist in the necessary adjustments to the environment. When these get out of order—because of over-stress or too violent an attack from without, pathological conditions arise and the physician is called in. A knowledge of the fundamentals of the homeostatic mechanisms is thus a prerequisite to intelligent treatment.

**HYDROCELE.**—A single inguinoscrotal incision for a double hydrocele operation, or hydrocele on one side and inguinal hernia on the other, is recommended by J J A McMullin (Surg Gynec Obst 49 558 (Oct) 1929). Eight cases of bilateral hydrocele and 3 cases of hydrocele on one side and inguinal hernia on the other are reported, together with details of technic.

**HYDROCEPHALUS.**—**DEFINITION.**—The term *hydrocephalus*, of course, means water in the head. Since the word is applied to an abnormal clinical state, it further implies that the water is in excess, and

is of pathologic significance. The cerebrospinal fluid can of itself be injurious only by exercising an undue pressure on the surrounding tissues. *Hydrocephalus is an excessive accumulation of cerebrospinal fluid under excessive pressure* (N M Dott Brain 50 548 (Oct) 1927)

**PATHOLOGY**—In the embryo the fourth ventricle is a closed sac, in the course of development the lateral recesses arise as pouches. If these remain imperforate, the ventricular fluid secreted by the choroid plexus has no outlet into the subarachnoid spaces. On the other hand, the recesses may be formed, but become occluded in post-natal life. In either case, hydrocephalus develops. (J Bland-Sutton Lancet 2 687 (Oct 6) 1928)

**TREATMENT** — **Roentgenotherapy** in hydrocephalus has, in certain cases, been found to be of value. **Roentgen irradiation** of the choroid plexus and surface of the brain, combined with repeated **puncture** is apparently a successful method of reducing the secretion of cerebrospinal fluid. B Heile (Beitr z klin chir 145 1 1928) in some cases, was able by this method to transform a progressive hydrocephalus into a quiescent one. L Schonbauer and K Hutter (Wien klin Wchnschr 42 806 (June 13) 1929) however, failing to obtain improvement with x-ray therapy in a case of hydrocephalus in an 11-year old boy, resorted to **electrocoagulation** of the **choroid plexus**. After treatment of the left side, the patient was much improved. After 18 months the symptoms returned when they were again relieved by a similar operation on the right side. Since the treat-

ment is comparatively dangerous these authors believe that it should be employed as a last means of preventing blindness.

**Uretero-dural anastomosis**, originally introduced by B Heile (Zentralbl f Chir 52 2229 (Oct 3) 1925, 54 1859 (July 13) 1927), was employed by F Cristopher (S Clin North America 9 473 (Apr) 1929) in the treatment of 2 patients with the communicating type of hydrocephalus. The first infant, aged 5 months, died soon after the operation, the second, aged 2½ months, derived temporary beneficial results. Six months later, however, this infant also died with symptoms of hydrocephalus present. A large quantity of pus was found in the urine. In performing this operation 1 of the kidneys is removed and the kidney pelvis, still attached to the ureter is anastomosed with the dural sac. Heile has treated communicating hydrocephalus by other methods such as draining the cerebrospinal fluid into the body cavities through implanted rubber tubes, silk suture wicks and the like. However, he believes that the uretero-dural anastomosis gives a more continuous drainage. As a rule, the rubber tubing becomes blocked by proliferation of connective tissue in about a year. On the other hand, L M Davidoff (Arch Surg 18 1737, 1929) feels that the uretero-dural anastomosis is not only too drastic an operation, but also that it lays the cerebrospinal spaces open to all the dangers of infection to which the genito-urinary system is subjected. Following the method of J S Davis and H F Traut (J A M A 86 339 (Jan 30) 1926), he has produced an epidermis-lined tube which he employed ex-

perimentally in dogs to connect the subarachnoid spaces with the peritoneal cavity. The results obtained were encouraging and the author feels that such a tube could advantageously supplant any homo-transplants or hetero-transplants of veins or arteries, or rubber, glass or collodion tubes in the attempt to produce a continuous drainage.

N M Dott (*loc cit*) successfully treated a case of chronic left *unilateral hydrocephalus* in an infant 9 months of age by cutting a large opening through the septum lucidum, thus permitting the left ventricle to drain through the right. This pathologic condition was found to be due to the obliteration of the foramen of Monro by scar tissue formation resulting from a localized ependymitis.

**HYDROGEN-ION CONCENTRATION**—Studies of the  $pH$  of the blood still continue to occupy the attention of many. It has been found among other things that electrical diathermy tends to increase this factor while the urine becomes alkaline or remains unchanged. The blood shift in  $pH$  is similar to that which occurs when the body temperature is raised by outside heat. The reaction to hyperthermia may be due to an increased catabolism. M A Bennett's (*J Biol Chem* 69 693 (Aug) 1926) finding that blood hydrogen-ion concentration tends to be increased as a result of hemorrhage has been confirmed. Studies of the  $pH$  of blood corpuscles reveal these to be slightly more acid than the serum, the volume of the former ranging between  $pH$  7.47 to 6.95 while that of the latter fluctuates between  $pH$  7.70 and 7.26. In hemo-

lytic conditions the acidity of the red cells is greater than normal. An approximate 5 per cent reduction in total base in pregnancy is reported. The reduction of alkali reserve in the acidosis of pregnancy being thus associated with an actual diminution of base, the use of the term "acidosis" as connoting an absolute collection of acids in the blood is misleading. Glucose does not protect against this lowering of the alkali reserve. When the alkali reserve of the blood is reduced, a reduction in the alkalinity of pancreatic secretion also obtains, and when the alkalinity of the blood is increased that of the pancreatic juice also rises. In pulmonary tuberculosis, the potential blood alkalinity is usually diminished. It is more marked in the exudative than in the fibroid and productive type. The changes are usually inversely proportional to those of the sedimentation and leukocytic index. Swingle (*Physiol Zool* 1 37, 1928) believes that the symptoms of adrenal insufficiency are simply those of a slowly developing acidosis. He bases his conclusion on the observation that no symptoms appear in bilaterally suprarenalectomized dogs until acidosis arises. This seems to be due to retention of phosphate and sulfates. By means of the hydrogen electrode, it has been found that venous blood is more acid than arterial as might have been predicted. The values for the serum of arterial blood ranged from  $pH$  7.72 to 7.86, while that of venous blood fluctuated between  $pH$  7.35 to 7.50.

Interest in urinary  $pH$  is generally centered around the so-called alkaline tide. Hubbard (*J Biol Chem* 1928-1929) and others have published significant findings. In subjects of

normal gastric acidity, the night urine is usually acid, becoming alkaline by eight in the morning. The peak of the alkalinity, which is at a pH of about 8, is attained after 2 to 3 hours. There are 2 factors which participate in the reaction change of the morning urine. One is the hydrochloric acid secretion in the stomach, which brings about an alkalinity after a meal is fed. The other is the adjustment of respiration to waking conditions, which frequently shows its effect very early in the morning. When the interplay of these 2 factors

is kept in mind, most results can be understood. Other studies, however, tend to indicate that short (2 days) periods of fasting tend to bring the urine to a fairly constant pH (acid side) whether an individual be awake or asleep. Hence Hubbard's idea about respiratory changes of awakening influencing urinary pH have yet to be substantiated.

**HYDRONEPHROSIS.** See KIDNEY

**HYPERNEPHROMA.** See ADRENALS, TUMORS

## I

**INFANT MORTALITY.**—Professor Rott's address before the Berliner Verein für Kinderheilkunde is abstracted in the Journal of the American Medical Association (J A M A 94 426 (Feb 8) 1930). There has been a steady decline in infant mortality in Germany since 1906. The birth rate has declined also but not as rapidly as the death rate. The former declined from 30.9 to 18.9 per thousand and the latter from 20.7 to 9.5 per thousand. Infant mortality due to congenital debility and pneumonia has remained high throughout the years while deaths due to nutritional disturbances and "other diseases" have decreased two-thirds. Rott believed the extensive propaganda for breast-feeding was responsible for the decline in infant deaths due to nutritional disorders. He classed infant mortality in Germany under 3 periods: (1) a period of decline of 15 per cent due to better care of infants, (2) a decline of 9 per cent due to progress in methods of infant feeding, (3) a recent period of very

little decline when pneumonia and general debility were the chief causes of death.

L. C. Mackenna (Rev. méd. de Chile, 56 1180, 1928) reported a decline in infant mortality in Chile from 243.8 per thousand in 1922 to 117.4 in 1926. The chief causes of death were first, respiratory infections, secondly, digestive diseases, and thirdly, nutritional disorders.

Infant mortality in India has continued at a high rate. According to the statistics of Ramdal Kapur (Antiseptic 26 149 (Mar) 1929), abstracted in Am J Dis Child 37 1293 (June) 1929, about one-third of the number of infants die before 1 year of age and in the cities the rate is higher. This high rate is attributed to the early marriages, to poor care of the child and to unhygienic surroundings.

The American Child Health Association has reported (August, 1929) infant mortality statistics from 729 cities for the year 1928. The rate increased 3.2 per thousand over the



preceding year. The total mortality rate for 1928 was 68.3 per thousand population. In 39 cities, of a total of 54 with a population greater than 100,000, the number of infant deaths was greater than in 1927. In the remainder of the cities of that size, the rate was lower in 1928.

P. L. McKinlay (J Hyg 28 394 (Feb) 1929) suggested a division of infant mortality statistics into 3 groups: the ante-natal, the neo-natal and the post-natal. According to him, certain factors influence the number of deaths in each division. These are (1) the provision of skilled attendance to the mothers at childbirth, (2) the health of the mothers and (3) the hygienic and social environment. His statistics indicate that skilled attendance alone influenced the ante-natal mortality rate, skilled attendance and hygienic surroundings affected the neo-natal mortality, only the mother's health and the environment decided the number of post-partum deaths.

An analysis of the causes of stillbirths was difficult because the source of the statistics did not represent a fair distribution and did not include the causes of such deaths. From a group of figures taken at random, McKinlay claimed that the chief causes of stillbirths were defects in the development of the fetus and prematurity.

**INFLUENZA.—ETIOLOGY.—**In a study of 102 cultures of the tissues and the blood of patients with influenza by J. Ferrán (Siglo méd 83 401 (Mar 2) 1929), only 25 per cent were positive. These were taken from patients who were seriously ill during the 24 hours preceding their death. The

organism obtained was a Gram-positive coccus or diplococcus. The cultures of these bacteria soon lose their virulence, but before they lose it, the virulence is so high that the subcutaneous injection of 1 drop of the first culture suffices to kill rats by an infectious pneumonic disease. A culture made from the consolidated lung of persons who died of the disease yielded the same bacteria.

S. Lister (J M A South Africa 3 179 (Apr 13) 1929) believes that the cause of "colds," some catarrhs, and in all probability influenza, will ultimately be found to be filtrable viruses, which will thus be linked up as the primary factor in many secondary pneumonias.

Whether Pfeiffer's bacillus is actually the exciting cause of influenza has not been definitely determined, states K. Kisskalt (Deutsche med Wchnschr 55 648 (Apr 19) 1929). The fact that even the most experienced investigators did not detect it in the beginning of the epidemic speaks against this theory. The circumstance that, in the later stages of the epidemic, Pfeiffer's bacillus was found in most patients, is not an absolute proof that it was the cause of influenza. The author points out that Pfeiffer's bacillus might have been an epidemically appearing saprophyte. Additional investigations will be necessary to give a definite decision on this question.

Pfeiffer's bacillus was present in only 8.7 per cent of 172 cases studied by P. Krause (Deutsche med Wchnschr 55 948 (June 7) 1929), nevertheless, he thinks this bacillus is the etiologic factor in influenza.

Following the intranasal inoculation of rabbits with a recently iso-

lated strain of Pfeiffer's bacillus, J E Walker (J Infect Dis 43 385 (Nov) 1928) recovered the organism from the nasal cavities of the animals for a period varying from 4 to 15 days. Two animals so inoculated showed a nasal discharge at the time when the organisms were most numerous. The inoculation was followed by the appearance of agglutinins in the blood stream. Animals once infected were immune to reinjection. After 2 months' cultivation, the strain lost its ability to attack the nasal mucous membrane of rabbits. Two other strains of Pfeiffer's bacillus were found to be unable to produce infection. Failure to produce disease with Pfeiffer's bacillus is demonstrated experimentally to be due either to immunity of the host as a result of previous infection, or to lack of virulence on the part of the organism. The fluctuations in the virulence of the organism and in the resistance of the host fit in well with what would be expected of the etiologic agent of epidemic influenza. These facts, together with the now well substantiated ability of the organism to produce primary respiratory disease of the cold-influenza type, are believed to connect Pfeiffer's bacillus with the etiology of epidemic influenza more closely than ever.

Females show a higher death rate from epidemic influenza than males, according to E Apert (Bull et mém Soc méd d hôp de Paris 53 625 (May 20) 1929).

The clinical manifestations of influenza during the 1928 epidemic as presented by Anders (Bull Pub Health, Phila 14 12 (Dec) 1928) were as follows. The period of incubation for most cases was 2 days.

The onset of the attacks was sudden, and, as in most epidemic outbreaks, marked by chilly sensations, followed by a rapid rise of temperature to a height of from 101.5° to 104° F (38.5° to 40° C) or higher. In a small percentage of cases, a distinct rigor was the first symptom. These cases showed, as a rule, the highest ranges of temperature. Headache and neuro-muscular pains were observed accompanying the initial chilliness and fever. At the end of 2 or 3 days, the fever rapidly declined, but would recur (a secondary rise) if the patient failed to remain in bed for at least 24 hours after both evening and morning records showed no elevation, and also when marked coryza and laryngo-bronchitis supervened. In some cases in which the temperature leaped to 104° F (40° C) at the onset, a drop to 101° F (38.3° C), or even 100° F (37.8° C), occurred during the first night and this was followed by a few days of moderate elevation. The mode of termination of the fever was by rapid lysis in most instances, less frequently by crisis. The pulse ranged from 80 to 110 per minute. The pains affecting the lumbar spine (rachialgia) had been somewhat less severe than in some of the former epidemics. The orbital pains, so well marked in former outbreaks, were somewhat less severe, as a rule, in the 1928 epidemic. A common complaint was of restlessness and sleeplessness.

The catarrhal manifestations which usually develop at the end of 2 or 3 days were in abeyance in some of the cases, they had been, however, fairly well marked in the majority and in the experience of the author, confined to the mucous membrane of the pharynx, larynx and trachea and pos-

sibly slight involvement of the main bronchi

The physical signs presented by the chest had been in most cases practically negative, although râles, either dry or moist, were audible over the trachea and larger bronchi. In the more severe types, a wide variety of râles were noted over the entire bronchial tree.

The cough, in many cases at least, was only moderately severe and attended with slight mucopurulent expectoration. The cough in this affection was due to an intense laryngo-tracheo-bronchial irritation. While the gastro-intestinal type was met in children more commonly than in adults, instances of this clinical type in the latter had been not infrequently seen in the prevailing outbreak. The usual symptoms, *viz*, nausea often persistent, occasional vomiting and diarrhea, with sharp abdominal pains, which, fortunately, were easily controlled, were encountered. The febrile movement accompanying these cases was slight in this epidemic.

In the writer's experience, fewer cases belonging to the rheumatoid type, in which violent pains in the nerves and muscles all over the body occur, were observed than is usual during an epidemic prevalence of influenza.

The striking malaise and prostration, the moderate fever, the more marked myalgic pains and the leukopenia should serve to distinguish true grippe from ordinary "colds" due to the *Micrococcus catarrhalis*. It is ever to be recollected that there is no distinctive clinical picture of influenza.

W Nipperdey (Deutsche med Wchnschr 55 478 (Mar 22) 1929) studied the hemograms of numerous

patients during an influenza epidemic. He observed that the blood-pictures show a tendency toward leukocytopenia, aneosinophilia or hypoeosinophilia and lymphocytosis. They show a certain uniformity which, in spite of the variations of the clinical aspects of the disease, indicates a common etiologic factor, in short, they speak for the existence of a special influenza virus. This virus has so far not been identified. The author thinks that it inhibits the action of the bone marrow.

The intestinal form of influenza sometimes presents symptoms that justify, H Abels states (Wien klin. Wchnschr. 14 1482 (Oct 25) 1928), the assumption of a catarrhal state of the gastric or intestinal mucosa.

**COMPLICATIONS** — Numerous complications of influenza have been reported. Glandular swellings at the angle of the jaw have been noted by A Plate (Deutsche med Wchnschr 55 62 (Jan 11) 1929). Renal complications are reported by Celli (It Morgagnin p 41 (Jan 9) 1928) and acute cystitis by J A Weijtlandt (Nederl tijdschr v geneesk 1 2262 (May 11) 1929). Inflammation of the tendo Achillis has been seen by H Deutsch (Med Klin 25 710 (May 3) 1929). Several types of ear involvement are cited by Sharpe (Proc Roy Soc Med 21 1923, 1928).

**PROPHYLAXIS.** — P Schmidt (Deutsche med Wchnschr 55 129 (Jan 25) 1929) with others, believes that public gatherings are most often responsible for the rapid spread of the disease. Hence, in times of epidemics they should be avoided. When this is not possible, as, for instance, in large cities, the inhaled air may be filtered through plugs of cotton placed

in the nostrils. The conjunctiva may be protected by wearing goggles. To protect the lips and nose, hydrous wool fat may be applied. Touching the eyes, nose or mouth with the fingers should be avoided. Scrupulous cleanliness, particularly with regard to handkerchiefs, is also essential for effective influenza prophylaxis.

**INSULIN.—PHYSIOLOGICAL ACTION**—A Norgaard and T. E. H. Thavsen (*Hospitaltid* 72 881 (Aug. 29) 1929) studied the effect of intravenous injections of insulin on the blood sugar curve in normal persons. There was a sharp drop to the lowest blood sugar value, reached about 25 minutes after the injection when 12 international units of insulin were used. The lowest blood sugar value observed was 20 mg per 100 c.c. A rise in the curve then occurred, practically reaching the value before the injection. The primary rise usually lasted from 10 to 20 minutes, and the secondary rise from 25 to 110 minutes.

H. Reinwein (*Deutsche med. Wchnschr.* 55 951 (June 7) 1929) presents 2 cases showing the effect of insulin on the circulation, and the effect of the circulation on carbohydrate metabolism. In a diabetic person with cardiac disease, the effect of insulin on hydration must be considered if one does not wish to risk making an existing circulatory insufficiency worse. The presence of circulatory insufficiency reduces the effectiveness of insulin considerably.

J. A. Collazo and N. Dobreff (*Rev. Assoc. méd. argent.* 40 209 (May-June) 1927) state that bile is increased in quantity and liquefied by the administration of insulin, provided that carbohydrates are given in abundance. Pancreatic juice is slightly increased. There is a prompt, transient increase in the secretion of the urine.

De Anciaes (*Arch. fur Ver-Kraubs.* 42 377 (Apr.) 1928) has found that insulin has a stimulating effect on the amount of hydrochloric acid secreted in the stomach. It also increases gastric motility, increases the amount of gastric juice secretion, and increases the secretion of ferments.

R. D. Lawrence and O. B. Buckley

(*Brit. M. J.* 1 597 (Mar. 30) 1929) found that by barring or eliminating all known causes of eosinophilia, a true eosinophilia exists in many patients receiving insulin. Of 20 cases studied, 10 had an eosinophilia of 4 per cent or more, and 5 of 9 per cent or over.

E. von Haynal, L. Vidovszky and G. Gyorgi (*Klin. Wchnschr.* 7 1543 (Aug. 12) 1928) made electrocardiographic studies on 33 non-diabetic patients with cardiac disease after intravenous administration of from 20 to 30 units of insulin. Definite disturbances in rhythm and conduction of stimuli were noted. Such patients, when subjected to insulin treatment, should be given large amounts of carbohydrates, and, in diabetic coma, they should receive dextrose by the vein or rectum, simultaneously with the large doses of insulin required. The action is supposed to be a direct one on the heart muscle.

**ADMINISTRATION**—O. Leyton (*Lancet* 1 756 (Apr. 13) 1929) states that when insulin is injected subcutaneously in *castor oil*, it will lead to a greater number of recoveries from diabetes mellitus. Insulin is supposed to have a more prolonged action when given in this manner.

H. Wassermeyer and A. Schafer (*Klin. Wchnschr.* 8 210 (Jan. 29) 1929) experimented on the use of insulin when applied intranasally. They employed a powdered insulin which was mixed with pure borax. In normal persons when 17 units were used, a noticeable reduction in blood sugar was found after 2 hours. Likewise, in diabetic patients marked reductions in blood sugar were noted. Dosage of insulin was found hard to control when given in this manner.

**UNTOWARD EFFECTS**—Various untoward effects have been reported after the administration of insulin. R. Jeanneret (*Rev. med. de la Suisse Rom.* 49 99 (Feb. 25) 1929) reports a case of hypersensitivity in a tuberculous woman. An extensive urticarial eruption, with edema of the face and intense itching, was observed after each injection of insulin. Desensitization of the patient was done by means of a series of intradermal injections of insulin (the skin reaction was negative at the seventeenth interdermal injection of insu-

lin), followed by a gradually increasing dose of insulin given subcutaneously

R D Lawrence and A S Hollins (Brit M J 1 977 (June 9) 1928) report 2 cases of hematuria caused by insulin treatment. Only 7 cases were reported in the literature prior to their report

Numerous authors report the frequency of atrophy of subcutaneous fat following the injection of insulin, undoubtedly not due to any pancreatic lipase in insulin. The effect is probably simply traumatic

E Andrews and K Reuterskiöld (Surg, Gynec Obst 47 665 (Nov) 1928) assert that insulin and glucose in patients who are suffering from post-operative conditions, and are, therefore, unavoidably dehydrated, is a highly dangerous and useless procedure. What these patients need is dextrose and water

R D Lawrence (Lancet 1 1328 (June 30) 1928) states that after repeated subcutaneous injections of insulin, one may expect the tendency to slight fibrosis in the subcutaneous fat with some increase in the connective tissue cells. They may produce focal necrosis. Prolonged injections into a limited area may produce marked fibrosis and fat atrophy

**DYSINSULINISM**—Since the discovery of insulin and the development of our knowledge of its physiologic function and therapeutic uses, evidence of the effect of overdosage has likewise been accumulating (Editorial J A M A 93 921 (Sept 21) 1929). Experience has abundantly shown that the quantity of the pancreatic hormone in the circulation must be carefully adjusted to the available carbohydrate for metabolism. When the blood sugar becomes too low, untoward symptoms manifest themselves. In man these may appear as hunger, sweating, loss of emotional control, faintness and lassitude—sometimes referred to as *insulin shock*. Hyperinsulinism of endogenous origin may be encountered. In a patient at the Toronto General Hospital, a slow-growing tumor of the islets of Langerhans was successfully removed by operation with apparently complete recovery and freedom from the characteristic attacks of coma and convulsions. In one of the Rochester patients, resection of a part of the pancreas brought about apparent relief from the constant tendency

to severe hypoglycemia. As F N Allan (Arch Int Med 44 65 (July) 1929) has pointed out, although hypoglycemia can be easily recognized, determination of the exact cause is difficult. Theoretically, the primary factor responsible for the change in the blood sugar level may be either failure of the liver activities in liberating sugar or overfunction of the pancreas. The differentiation between these 2 causative factors is a problem. The effects of epinephrine and of pituitary extract, both of which tend to increase the blood sugar under ordinary conditions, may not be effective in the absence of adequate hepatic performance

P M D'A Hart and H P Bond (Brit M J 1 895 (May 18) 1929) suggest the diagnostic value of plantar response in insulin coma. In coma due to hyperglycemia no such response is found, unless some pyramidal disease accompanies the diabetes. When this physical sign in a comatose diabetic patient on insulin treatment is found, it is evidence enough that the coma is due to excess of insulin, and consequently sugar should be given at once

Stanley W Imerman (J A M A 89. 1778 (Nov 19) 1927) reports the use of intracardiac injections of dextrose in a case of insulin hypoglycemia. The patient was moribund and any delay was thought might be fatal. Ten cc (2½ drams) of 20 per cent dextrose was injected intracardially. At the end of 2 minutes the patient had recovered consciousness. Eighty cc (2¾ ounces) of a 20 per cent dextrose was given intravenously. Patient made a good recovery

**THERAPY IN NON-DIABETICS**—From investigations carried on by F Fonseca (Arch f Verdauungskr 42 362 (Apr) 1928) it appears that emaciated persons treated with insulin quickly gain weight and that this gain is not due to increased water retention, but to the influence of the insulin either on the gastro-intestinal tract or on the tissue cells. The writer is of the opinion that the majority of cases of *obesity* are cases of absolute or relative hyperinsulinism. Very often this hyperinsulinism passes into hypoinsulinism as the pancreas becomes exhausted. This explains why adiposity often precedes diabetes. While hyperfunction of the pancreas is

present, fat is being stored in the tissues. When this gives way to hypofunction, the diabetic who must now produce sugar from his own fat, becomes emaciated.

In 13 cases of chronic non-diabetic, **underweight** persons, E. S. Nichol (J. Florida M. A. 16 29 (July) 1929) used insulin with high carbohydrate feeding as a means to fatten these individuals. Nine made a satisfactory gain in weight, with a definite improvement in the subjective symptoms. No loss of weight was observed during the month following the withdrawal of the insulin treatment.

P. Russo (Studium 19 64 (Feb. 20) 1929) recommends insulin as a good therapeutic agent for states of **wasting** which are not due to serious organic disease and records 10 cases so treated. The appetite, weight and feeling of well-being improved in these cases. Plenty of carbohydrate was given with each meal, preceded by 5 to 10 units of insulin. Towards the end of the treatment, which usually lasted over 3 weeks, as high as 25 units were given before meals.

Numerous authors, particularly E. Vogt (Zentralbl. f. Gynak. 51 3034 (Nov. 26) 1927), discuss the advantages of insulin therapy in gynecological conditions. Vogt states that insulin is of use in certain cases of "ovarigenous bleeding," cases of **menorrhagia** or **metrorrhagia** attributable, in the absence of morbid uterine conditions, to ovarian dysfunction.

**INTELLIGENCE TESTS IN CHILDHOOD**—Methods of measuring the intelligence of infants under the age of 1 year have been limited usually to observations of physical and behavior development. The relation of age to the infant's first attempt to sit up, to reach for an object or to follow a light are records of value in the determination of mentality. It has been claimed that infants make use of their special senses from the day of birth and that habits and character begin to be formed at that time. The testing of the sense of hearing in a newly-born

infant has been investigated with the employment of a conditioned reflex by C. A. Aldrich (Am. J. Dis. Child. 35 36 (Jan.) 1928) who made the infant cry by scratching its foot and at the same time rang a bell at the side of the crib. Soon, the ringing of the bell alone caused the infant to cry.

For the pre-school children, modifications of the Binet test of intelligence may be adaptable, but there are often wide variations in the results. Question-answer methods depend too much on the child's knowledge of the language and also on previous home training. Many of the test questions necessarily refer to the identification of familiar objects and these questions have been constantly repeated in many homes. This is the opinion of D. K. Hallowell (Psychol. Clin. 16 235 (Nov.-Dec.) 1927) who has substituted for the language tests certain of the concrete performance tests in the examination of 650 children ranging in age from 12 months to 47 months and belonging to families differing in race and economic status. Many factors of variation entered into the results of these tests, such as the problem of holding the interest of the child and overcoming his timidity. Each child had to be given the test in an individual manner but the author concluded that it was possible from her investigations to establish a standard of intelligence for each age which could be employed as a comparison for subsequent tests. The mental development of a child has been determined usually by the age at which he begins to talk and walk. I. A. Abt, H. M. Adler and P. Bartelme (J. A. M. A. 93 1351 (Nov. 2) 1929) have

tested the validity of this method by making a statistical study of 1000 persons varying in age from 44 months to 23½ years. The intelligence quotients were determined by the Stanford-Binet tests and compared with the time of acquisition of speech when possible. The criterion for judging the onset of talking was taken from the definition of W. Stern to be the time at which the child first "utters a sound with a full consciousness of its meaning and for the purpose of communication." The average time of this event for this series was 19 months for boys and 18 months for girls. A definite relation of the intelligence quotient and the age of onset of speech was noted—those with higher intelligence talked at an earlier age. There was a similar relation between the intelligence quotients of this group of 1000 and the age at which they first walked. The more intelligent children began to walk earlier. The average age of onset of walking was 19 months. It was noted that those children who had had enuresis at the age of 3 years or later had learned to walk later than those who had no enuresis after 3 years of age. Children who came from families in which there were older brothers or sisters had not learned to talk sooner than other children.

With the aid of simple intelligence tests on infants, A. Gesell (*Psychol. Rev.* 36: 307 (July) 1929) was led to believe that characteristics of behavior are a manifestation of natural growth and maturation rather than a result of training or of experience following trial and error. He did not agree with many psychologists who assert that the actions of newly-born

infants are random actions and he gave instances to prove that they followed a definite pattern. (1) When a light was held for the first time before an infant, reactions of a similar nature occurred in infants of the same age. (2) Each of twins reached for an object for the first time at the same age, began to sit up at the same age and executed certain performance tests at the same age. (3) Training of 1 of twins was a slower process at a given age than the training of the other a few weeks later, demonstrating that mental and physical capacities developed at certain rates and could not be hastened by training. (4) Infants' mental development did not seem to be handicapped by physical defects unless there was marked undernourishment. (5) Maturation of emotions also was shown to occur. Infants who had no fear from certain procedures at early ages would have evidences of it when they were a few months older.

**INTESTINAL OBSTRUCTION, ACUTE.**—The continued high mortality of this condition stimulates investigation and discussion along many lines, special attention being directed to the chemical changes found in the blood and to the methods of combating them, and also to the search for the identification of the toxic material responsible for the early developing prostration in high tract obstruction. Detailed studies of operative technic and post-operative procedure direct attention to the importance of anesthesia, intestinal drainage and the problems of chloride reduction and dehydration.

**ETIOLOGY.**—Case reports, where unusual etiologic factors have been



responsible, include, among others, those due to improperly masticated foods of slow digestion, Krecke (Deut Ztschr f Chir 215 336 (Mar) 1929) describes a case in which a mass of mushrooms obstructed at a point of previous anastomosis 15 cm from the ileocecal valve, while A Roldán (An de Fac med Montevideo 14 315 (Mar) 1929) notes an instance in which an unmasticated dried peach was the offending food. Materials within the lumen of the bowel, other than food, have also been reported as causative factors. C Noon (Brit. M J 1 342 (Mar 3) 1928), for instance, observed a case of hairball where 4 masses of this character were found in the distal 2 feet of the ileum and where pressure necrosis with escape of some hair had occurred. Hartglas (Bull et mém nat Soc de chir 55 613 (May 11) 1929) reported a case due to ascaris, in which the weight of the collected mass of parasites had determined a volvulus of the loop and prolapse into the *cul-de-sac*. Occlusion by a jejunal subserous hematoma, of undetermined origin, is reported by E Santoro (Arch itali di Chir 22 645 (Dec) 1928), and even by the pressure of the gravid uterus where, in one instance, the cecum, and, in another, the descending colon, was interposed between the sacral promontory and the enlarged uterus. Storp (Med Welt 3 383 (Mar 16) 1929) states that analysis of the literature indicates that this accident occurs more frequently during the seventh month than at any other period.

**DIAGNOSIS.**—The necessity of early diagnosis is stressed by all, and since in this condition laboratory aid is of little value, careful attention to

the history is imperative, so that a prompt decision to operate is reached before fecaloid vomiting occurs, which symptom, although indicative of occlusion, often marks the presence of changes in the intestinal structure that are beyond surgical help. Delay in making the diagnosis in this acute condition is measured by hours, and each hour elapsing between onset and surgical intervention, is of vital moment. C J Miller (Ann Surg 89 91 (Jan) 1929) estimating the increase at 1 per cent per hour. Education of the public is impossible in such a limited field. Education of the profession is difficult, as evidenced by the article of Miller, cited above, who specifically lists a group of 28 patients in the hospital from 12 hours to 5 days before operation was performed, with a mortality of 22 of the group. This high mortality indicates the price of delay where symptoms warranting exploratory examination are present but disregarded.

We will, therefore, always have a considerable proportion of advanced cases, and it is with the specific details of their treatment that intensive study is necessary. The factors of immediate importance are the duration of the process and the degree of circulatory damage in the involved segment. Though the extent of circulatory damage, and hence mortality, is often determined by delay, actual strangulation is not necessary for a lethal outcome, for toxemia alone, in the absence of strangulation, may be sufficient to cause death, even though the fecal current has been restored by operative procedure. Recognition of the responsible toxic agent would, therefore, be a most valuable aid in



therapy The claim of Williams that the toxin from *Bacillus welchii* was largely responsible has not been proved A W Oughterson and J H Powers (Arch Surg 18 2019 (Apr) 1929), J C Orvin and C A McIntosh (*ibid* 18 2237 (June) 1929) have failed in experimental work to see benefit, though H W Carson and Zachary Cope (Canad M A J. 20 556 (May) 1929) pay high tribute to the value of perfringens antitoxin in some cases, and J O Bower and J H Clark (Am J M Sc 176 97 (July) 1928) make a preliminary clinical report in a small group of patients, distorting the clinical findings in order to favor the method

O H Wangenstein and G W Waldron (Arch Surg 17:430 (Sept) 1928) find "the products of disintegration of the bowel to be markedly toxic when segments of the small bowel were allowed to autolyse in the peritoneal cavity, or when rats were given the products of autolysis from sterile containers kept in incubator" It is evident, therefore, that no reliable detoxicating agent has been reported

Corroboration of the previously reported blood chemistry changes is made by T O Orr and R. L. Haden (J A M A 91 1529 (Nov 17) 1928) and by M A McIver and J L Gamble (*ibid* 91 1589 (Nov 24) 1928) R Rockwood and R S Anderson (Surg Gynec Obst 46 352 (Mar) 1928) report similar findings and state that where the blood chloride content falls below 260 mg per 100 cc, there is a distinct increase in mortality rate unless appropriate therapy is instituted

To meet the situation, accurate, expeditious, surgical technic must be developed, followed by post-operative chemical therapy to combat changes

wrought by dehydration, chloride loss and toxemia

**OPERATIVE PROCEDURE.—**  
**ANESTHESIA**—Discussion of the value of spinal anesthesia finds proponents and opponents P Duval (Bull et mém Soc nat de chir 53: 596 (May 7) 1927) concludes that spinal anesthesia is the anesthesia of choice in acute ileus except in the cases with severe intoxication or low blood-pressure, though others of his French confreres are not as enthusiastic

C J Miller (Ann Surg 89 91 (Jan) 1929), in a painstaking study of 343 cases treated at the Charity Hospital and at the Touro Infirmary, New Orleans, reaches the conclusion that ether is the anesthetic of preference

[The editor believes that in the early periods of obstruction the great value of spinal anesthesia lies in its muscle relaxing properties, greatly facilitating and lessening intra-abdominal manipulation, and in the frequency with which evacuation of the bowel occurs, while under its influence, on release of the mechanical obstruction Objections to its blood-pressure reducing tendencies in advanced cases are valid, but this situation can be met, fluid supplied and anesthesia prolonged, if necessary, by infiltration of the field immediately preliminary to incision with **novocaine** (to which 1 drop of **adrenalin solution** per 10 cc—2½ drams—is added) in amount approximating 200 cc—6<sup>2</sup>, ounces—ED ]

**SURGICAL TECHNIC.**—Actual surgical technic involves the location of the point and cause of obstruction, the recognition of the extent of vascular change, and the method of securing drainage of the stagnant

material In malignancy of the colon, with acute obstruction supervening, a preliminary **blind-cecostomy** is recommended by Burgess in cases presenting considerable distention Resection and anastomosis under the circumstances of local pathology and systemic prostration is inadvisable, and a "gun-barrel" enterostomy of the gangrenous loop with later closure is advocated by the same author High enterostomy by the Witzel method, or modification, is almost universally advised to rapidly remove the toxic element, whatever it may be, from the rapidly absorptive area of the upper bowel

**POST-OPERATIVE TREATMENT**—The work of Haden and Orr (*loc cit*) in again calling attention to the value of the free use of saline and fluid is recognized This can be given subcutaneously as **normal saline** by the continuous method of Kanavel, serving the dual purpose of chlorine and water replacement W D Gatch, H M Trusler and K D Ayres (*Surg Gynec Obst* 46 332 (Mar) 1928) favor **physiologic sodium chloride**, while A H Burgess (*Lancet* 1 857 (Apr 27) 1929) and A Gosset, L Binet and D Petit-Dutailis (*Presse méd* 36 17 (Jan 7) 1928) use **hypertonic solution** intravenously in addition, the latter advocating 20 cc (5 dram) doses of a 20 per cent solution, spaced at 5 regular intervals during the first 24 hours **Glucose** intravenously is advised in addition

Evaluation of the procedures recommended in this group of surgical emergencies is possible only if all details are given in the case series studied These details must at least include

1 Age, general health and physical condition, adiposity

2 The length of existence of the pathology in hours, and the reaction of the patient to it (a) Emesis (amount, type), (b) circulatory condition, (c) distention

3 Anesthesia Kind, reaction to it, effect on tendency to eventration

4 The point and cause of obstruction and the degree and amount of vascular impairment

5 The presence or absence of peritonitis, its extent and bacteriology

6 Situation of enterostomy, if done, and amount of discharge

7 Kind, amount and method of serum administration, if employed

8 The amount and concentration of saline administered post-operatively

9 Other treatment, glucose, peristaltic stimulants, etc

## INTRAVENOUS THERAPY

—Norman N Keith (*J A M A* 93 1517 (Nov 16) 1929) discusses the physiologic principles and therapeutic application of intravenous medication As early as 1865, Robert Boyle and Christopher Wren realized the possibility of intravenous medication and injected drugs into experimental animals During the epidemic of Asiatic cholera in western Europe in 1831 and 1832, Latta introduced the practice of giving intravenous "saline infusions" to patients in severe collapse This procedure was suggested to him by the chemist who found the blood of cholera patients deficient in water and saline matter

Since Ehrlich's introduction of arsphenamine, intravenous medication has had an important place in the treatment of certain diseases caused by specific agents, especially those due to spirochetes and trypanosomes The promiscuous intravenous injection of many well known drugs is wrong in principle and in practice

In intravenous medication it is essential to use chemical substances of the highest purity and water that is sterile and free from all traces of organic matter Since

dextrose is important in intravenous therapy, it is imperative to secure a chemically pure and non-toxic preparation

The rate of injection of intravenous solutions is often too rapid, from 30 to 40 cc each minute is a satisfactory rate, when a considerable amount of fluid is being injected. The object of intravenous therapy is discussed under 4 general headings (1) to supply blood and circulating fluid, (2) to combat dehydration of tissue, (3) to produce dehydration, and (4) as an aid to chemotherapy

The indications for *blood transfusion* are **acute hemorrhage** and **surgical shock**. In **secondary anemia** and certain toxic conditions, blood transfusions are markedly beneficial. It has been demonstrated by L. B. Robertson to be practical and beneficial in severe **toxemias of childhood**, particularly in the **toxemia** associated with large superficial burns

In dehydration intravenous therapy is indicated. Dehydration is an important factor in **Asiatic cholera**, **bacillary dysentery**, the **acute anhydremia of infants**, upper intestinal obstruction exemplified by **pyloric obstruction** due to **chronic duodenal ulcer**, **pernicious vomiting of pregnancy**, **obstructive jaundice with vomiting**, **uremia** and **diabetic coma**. One per cent solution of sodium chloride or 10 per cent of dextrose, singly or combined, are satisfactory for intravenous medication as a routine in dehydration states. If oliguria or anemia is present, a 20 per cent solution of dextrose may increase the urinary excretion. When definite acidosis is present in **diabetic coma**, 500 cc (1 pint) of a 5 per cent *solution of sodium bicarbonate* may be given with benefit

A therapeutic production of dehydration is indicated at times, as in the treatment of **edema**. In 1919, Weld and MacKibben demonstrated that hypertonic solutions of ordinary chloride, sodium sulphate or dextrose given intravenously, caused reduction in pressure of cerebrospinal fluid and decrease in the size of the brain. They can be used in cases of **injury to the head**, of **tumor of the brain**, and of **meningitis**. If rapid action is needed, from 50 to 100 cc ( $2\frac{1}{2}$  to  $3\frac{1}{2}$  ounces) of a 15 per cent to 30 per cent *solution of sodium chloride* or from 100 to 500 cc ( $3\frac{1}{2}$  ounces to 1 pint)

of a 20 per cent *solution of dextrose* is given by vein in single or repeated doses. Blackfan and Hamilton observed temporary recovery from the alarming symptoms of **uremia** in children following the intravenous use of a 1 per cent *solution of magnesium sulphate*. *Novasural* or *salyrgan* have been found of distinct value in the treatment of many types of **edema**

The intravenous use of a large number of drugs and dyes has been reported by many workers. *Tryparsamide* produces striking results in the treatment of **neurosyphilis** and **dementia paralytica**. *Arsphenamine* is known for its use in **syphilis**. Antimony given intravenously, in the form of *antimony* and *potassium tartrate*, has been found effective in the treatment of different types of **leishmaniasis**.

Dyes have been found useful in the treatment of **septicemias**. *Gentian violet*, *mercurochrome*, and *acriflavine* are being used. *Gentian violet* has been used in **staphylococcic**, **hemolytic streptococcus** and **green-producing streptococcic infections**. The dose is 5 mg ( $\frac{1}{12}$  grain) per kilo ( $2\frac{1}{8}$  pounds) of body weight, and is administered in a solution of from 0.25 to 0.5 per cent. Piper and Young reported good results in **sepsis** due to hemolytic streptococci, in **erysipelas** and in **perinephritic infections**. The dose is 5 mg ( $\frac{1}{12}$  grain) per kilo ( $2\frac{1}{8}$  pounds) of body weight in a 1 per cent solution.

*Acriflavine* has been used in **septicemia** and **epidemic encephalitis**. The dose is 5 mg ( $\frac{1}{12}$  grain) per each kilo ( $2\frac{1}{8}$  pounds) of body weight in a 1 per cent solution.

Two drugs that are now given by mouth may be used intravenously, viz, *quinine hydrochloride* and *digitalis*

**IODINE** —H. J. Novack (M. J. and Rec. 130.39 (July 3) 1929) states that of all the elements at our command, one of the most important, from the viewpoint of therapeutic efficiency, as well as broad usage, is iodine. At various times during the last few years, this element has been brought into the limelight by virtue of its newly discovered attributes, such as its usefulness as a radiographic control medium, its ability to stabilize metabolism preliminary to goiter operations, and its value as a goiter prophylactic generally.

**PHYSIOLOGICAL ACTION** — Iodine is supposed to stimulate a "direct action" It is anti-microbic It forces the body fighting powers more completely to eradicate the acute existing infection, and prevents to a degree any residual infection from remaining as a focus for future activation The glandular action of iodine has always been associated with that of the thyroid It has a stimulative action on the thyroid, ovaries, pancreas and salivary glands The effect upon the pancreas is such that in the presence of diabetes of a moderate type, the blood sugar is gradually lowered, requiring descending doses of insulin **Amenorrhea** due to ovarian dysfunction, uniformly responds to iodine medication Iodine lowers the viscosity of the blood and increases its clotting time, so that in **arteriosclerosis**, **atheroma** and **sterility**, blood of a lowered viscosity will flow through capillaries that it would otherwise block and obliterate The eliminative action of iodine is well known Its greatest value is in **gout** It has an eliminative action upon insoluble lead, arsenic and mercury compounds that have accumulated and are held within the body through therapeutic or industrial uses It also has an oxidative action It may oxidize abnormal fibrous tissue and replace it by normal cellular elements

**IRIS — ANOMALIES** — H S Grable (Am J Ophth 12 547 (July) 1929) believes that *heterochromia iridis* with cyclitis and cataract should be regarded as a definite clinical entity although the cyclitis is often so slight as to render its presence doubtful Discoloration of the iris is always present and is to be regarded as a sequel to, not as a precursor of, the uveitis A mild form of glandular tuberculosis is commonly regarded as the cause Cataract is always a complication, coming on a few months or years after the onset of the disease

C Hobart (Am J Ophth 11 454 (June) 1928) reports 2 cases of *coloboma* of the iris, one typical and the other atypical, with no visible colo-

boma of the choroid, ciliary body, or lens

**ATROPHY** — J H Waite (Am J Ophth 11 187 (Mar) 1928) reports a case of essential progressive atrophy of the iris which followed the clinical course as outlined by de Schweinitz The patient was first seen in 1923, when the pupil was found to be eccentric and the iris was beginning to show atrophy An attack of acute glaucoma was relieved by a Lagrange operation Normal tension continued and there was no change in the visual field or in the vision

J M Griscom (Am J Ophth 10 647 (Sept) 1927) presents drawings and a complete report of the slit-lamp examination in a case of essential atrophy of the iris In one iris there were 2 complete holes and 2 other spots where only retinal pigment remained Bordering these areas, the stroma had the streaked appearance presented by snow which is rapidly melting under the influence of a warm sun and wind The endothelial cells had been almost completely destroyed, but there were no evidences of inflammation The tension was increased to 35 mm Hg The visual field was diminished especially on the nasal side, and the central vision was reduced to 20/40

**INJURIES** — F B Harding (Pennsylvania M J 32 766 (Aug) 1929) reported a case of complete loss of the iris, which is of particular interest because of the light which it may throw upon the process of accommodation The iris had been completely torn off by a splinter of glass, so that the ciliary muscle was exposed and the ciliary body and the fibers of the zonule of Zinn could be seen plainly Even with an ordinary

ophthalmoscope it was possible to see that the body of the ciliary muscle distinctly moved forward and that the lens approached the cornea, also the periphery of the lens assumed a slightly mottled appearance which became smoother in distant vision. The patient, 10 months after the accident, had 6/6 vision and was not particularly annoyed by light, though she wore a slightly colored lens.

In one of 2 cases reported by N M Black and F H Haessler (J A M A 93 1043 (Oct 5) 1929) in which an intra-ocular foreign body of iron was not demonstrable on an entirely satisfactory roentgenogram, the foreign body remained in the iris for a year. The mass of tissue that formed about it was diagnosed as a neoplasm since the Wassermann and tuberculin reactions were negative and because it was assumed that foreign body had been reliably ruled out by the roentgen-ray examination. A fragment of iron longer than 1 mm was found in the piece of iris tissue removed, and subsequently a wound of entrance through the cornea was demonstrable.

**IRITIS**—E Thomson (Brit J Ophth 12 189 (Apr) 1928) reports 10 cases of unilateral uveitis in children observed over a period of several years. The outstanding features were (1) the unilaterality of the trouble, (2) signs of uveal tract disturbance without iritis or fundus changes, (3) chronicity. Only 2 of the patients regained normal vision and these 2 had relapses and persistent vitreous opacities.

While many of the children have remained under observation for several years, the etiology and end-result of the condition have not been determined.

**TREATMENT**—O G Morgan and F D Howitt (Proc Roy Soc Med 21 14 (Jan) 1928) express surprise at the fact that although diathermy has been found of value in treating inflammations elsewhere in the body, it has been used very little in inflammations of the eye. Since diathermy is not heat by conduction or radiation, all the tissues between the 2 electrodes reach the same temperature as soon as the current passes, and short applications of diathermy are equivalent to very long applications by the older methods. Heat dilates the vessels and promotes rapid circulation and many micro-organisms are affected by a rise in the temperature above 42° C (107.6° F). Diathermy raises the temperature of the whole eye to about 48° C (118.4° F).

In 14 cases of *iridocyclitis* in which they used diathermy the treatment was followed by diminution of the pain and ciliary congestion, disappearance of the keratitis puncta, and reduction in the tension.

**PROLAPSE**—R A Peterson (Am J Ophth 11 979 (Dec) 1928) finds that prolapse of the iris is common in China and reports 38 cases. A large conjunctival flap was made and 2 mattress sutures were introduced. The prolapsed iris was then excised and the sutures were tied. On completion of the operation, atropine sulphate and one of the solutions of silver proteid were instilled, a firm dressing was applied over both eyes, and the patient was kept in bed for one day.

Kuhnt's pedunculated flaps were found unsatisfactory, as were also single sutures.

In 28 cases in which a good operative result was obtained there was

definite improvement of vision ranging from 20/200 to 20/20

**TUBERCULOSIS.**—The use of x-ray treatment in 170 cases of ocular tuberculosis is reported by W Stock (Ztschr. fur Tuberk 51.122 (June) 1928). In some of these cases very good results were obtained, a clinical cure being effected in from 14 days to 4 weeks, and in many instances the cure was permanent. In other cases marked improvement was brought about. The treatment was most effective in cases of pure iritis with formation of nodules. The *prognosis* was found to be better in younger patients than in those over 40 years of age. The results in pure cyclitis were less favorable. Though roentgenotherapy was not entirely successful in the majority of cases of tuberculous iridocyclitis, he believes that it marks a step forward in the treatment of a disease of such unfavorable prognosis.

**TUMORS AND CYSTS** — Reviewing the cases of *uveal cyst* of the iris, W H Wilmer (Arch Ophth 1 162 (Feb 1929) remarks that with more exact methods of examination these cysts are not so rare as was formerly thought. A case is reported in which both eyes showed total posterior synechiæ with iris *bombé*. From the posterior pupillary margin of the left eye a dark brown, non-translucent, granular mass was seen to protrude, transfixation of the iris was performed, and 3 weeks later the sclero-cornea was trephined with peripheral iridectomy. With the re-

duced tension the cyst collapsed, and later the opaque lens was removed. When the eye is free from pain and there is useful vision, this or some similar procedure should be resorted to before enucleation.

C A Young (Am J Ophth. 11 864 (Nov) 1928) states that primary *melanosarcoma* of the iris is a relatively rare condition. It occurs as a rule after middle age and is characterized by slow growth and late inflammatory symptoms. It is relatively benign, but tends to recur and to form metastases. In a case in which enucleation had been done 11 years after excision of the tumor, death resulted, 6 years after enucleation, from general metastasis.

B Chance (Am J Ophth 11 859 (Nov) 1928) reported the case of a man 42 years of age, with a history of a mass in his iris for 27 years. The mass was yellow-brown and dome-shaped. It occupied the angle of the anterior chamber and was attached to the iris in the mid-zone by a narrow base. It was somewhat nodular but not transparent or translucent, with fine capillaries and vascular splotches on its surface. There were no signs of inflammation, the fundus and the tension were normal, vision 6/6. The mass was removed. On examination, it was pronounced a mixed-cell sarcoma with melanotic pigment. Eighteen days after its excision the globe was enucleated. No further involvement of the eye was found, and no general metastases have been discovered in the subsequent 6 years.

## J

**JAUNDICE.**—In all of the many articles on jaundice which appear from all corners of the world, one looks in vain for the solutions of a number of important questions which have always intruded themselves into the consideration of jaundice. The practical questions to be solved consist of the discovery of good, reliable, simple methods of clinical application for the quantitative separate determination of bile pigments and bile salts in the blood and urine. Existing methods are not satisfactory. But thus far no substitutes are forthcoming that meet the above requirements. Take, for example, the conception of “dissociated jaundice” as developed in France some years ago. Perhaps modifications of this idea will be necessary when satisfactory methods are available. The conception briefly put is the liver is the only place in the body where bile salts can be made, but bile pigments can be made from altered hemoglobin in all sorts of places in the body, specifically, where there are reticulo-endothelial cells. Therefore, in jaundice, if only bile pigments are present in the blood (the bile salts are colorless and do not cause icterus), the liver is not involved, if both pigments and salts are present the liver is participating. Unfortunately, the conditions are not as simple as this, at least, we are not sure they are not, for we cannot as yet estimate accurately these 2 components of bile. Also in kidney dissociation, probably much could be learned if we knew the relation between blood concentration and urine secretion. It is well worth much time and effort to develop good methods.

Studies of the *bradycardia* in icterus have led to the conclusion that it is of nervous and not myocardial origin. But in addition to bile salts as a cause of bradycardia, jaundiced individuals have disturbances in their salt balances, *e g*, calcium changes, and also potassium changes. At any rate, the intravenous injection of bile salts into normal individuals seldom causes bradycardia.

Two cases are reported by I. H. Page (Am J. M. Sc 177 273 (Feb) 1929) of unusual interest. He entitles his article “Ipsilateral edema and contralateral jaundice associated with hemiplegia and cardiac decompensation.” The edema in these cases was localized to certain parts of the body. When jaundice occurred the non-edematous parts only became discolored. As Page states it, the permeability of tissues for bile pigments conditions the yellow color. Since the permeability is the factor, he examines briefly our knowledge and finally admits there is none bearing on this point. He also does not know whether bile salts (and not pigments) enter the edematous parts. All in all, many interesting problems are brought forth for discussion.

**ETIOLOGY**—P. Rissmann (Zent f Chir 54 2051 (Aug 13) 1927) utters the warning that jaundice during the course of *pregnancy* may not be due to the pregnancy itself. He cites pregnant women with gallstones, paratyphoid infection, etc. In fact, he believes the term “recurring icterus of pregnancy” should be dropped from obstetrical literature because no proved case has been observed. On the other hand, jaundice

has been observed in the liver injury of eclampsia

**PATHOLOGY**—W C Buchbinder and R Kern (Arch Int Med 40 900 (Dec) 1927), studying the bones, found in jaundice a small storage of calcium, a disturbance in its metabolism and rearrangement of its distribution and a defect in the intestinal utilization. It is interesting to note that the same authors found a much diminished tendency to tetany after thyro-parathyroidectomy in jaundiced dogs. This may be due to a depressing action of bile on the central nervous system, but it may also be related to the disturbed calcium metabolism.

**TREATMENT**—It often is necessary to drain the common duct or the gall-bladder for certain lengths of time. Since it is very easy to remove a tube but very difficult to replace one in the common duct, it becomes a matter of nice judgment as to when a tube should be removed. Ordinarily, tubes are clamped off first for an hour or 2 after meals, then for longer periods until finally they are clamped permanently for 1 or 2 weeks. If no symptoms occur, the tube is removed. Several authors have injected iodized oil into such fistulas and then taken x-ray films of the neighborhood to visualize conditions before removal of the tubes.

The *hemorrhagic diathesis* comes in for its share of treatment. Years ago, Pavlov, among others, observed the development of an osteomalacia or removal of calcium from bone in dogs with permanent biliary fistulas. With the development of methods for estimating calcium, chemical studies of this phenomenon were forthcoming. While disturbance of calcium

metabolism may not be the only cause of the bleeding in icterus, it nevertheless has some part in it and calcium is a good remedy for it. Probably destruction of liver cells in jaundice interferes with the proper elaboration of other clotting substances such as fibrinogen and the whole story is quite complicated. The calcium part is recognized also by recommendations to feed diets high in vitamin D content and to give quartz light therapy.

**CATARRHAL — ETIOLOGY**—The subject of catarrhal jaundice has been considered by a number of writers. H Eppinger (Klin Wchnschr 8 679 (Apr 9) 1929) concludes that the old idea of inflammation of the duodenal papilla as the cause of the obstruction is incorrect. He had opportunity to study 4 cases of catarrhal jaundice post mortem, and found parenchymatous disease of the liver. Naunyn's "*cholangie*" which is not an inflammatory lesion of the smaller ducts like a cholangitis, but a sort of swelling, was also present. This conception of a parenchymatous disease of the liver is gaining adherents and if true would increase interest in possible sequelæ such as cirrhosis and in treatment directed toward sparing liver cells. In fact, Rogers recommends administration of insulin and sugar.

**INFECTIOUS — ETIOLOGY**—In infectious jaundice (Weil's disease), the *Leptospira icterohemorrhagiae* is the causative agent. It is transmitted by the bite of an infected rat. Thus reports of transmission by soil contamination in a scalp wound is interesting, and also by drinking contaminated water. Probably, more



critical investigation will throw doubt on these observations

Yellow fever and Weil's disease are different clinical entities. Several observers report no differences between *Leptospira icteroides* and *L. icterohemorrhagiae*, therefore, they conclude the cause of yellow fever is still unknown, since *L. icteroides* is believed to be its cause. More investigation is needed.

**OBSTRUCTIVE—PROGNOSIS**—The obstructive jaundice due to stones, tumors of the head of the pancreas or of the ampulla and common duct, etc., received much study from a number of the controversial aspects. O. H. Wangenstein (J. A. M. A. 90:1683 (May 26) 1928) asks the question of how long man may live with obstructive jaundice. The answer is, ordinarily for from 4 to 6 months. But he hastens to quote cases showing that a longer duration of life is possible such as 3 years, 16 years, etc. Apparently gradual occlusion is less fatal than rapid occlusion. Various operative treatments for the condition are recommended such as cholecystoenterostomy, cholecystogastrostomy, choledchoenterostomy, etc.

**TOXIC—DIAGNOSIS**—Differentiation of arsphenamine and catarrhal jaundice may be of importance at times. J. Lerman (Am. J. M. Sc. 178:54 (July) 1929) states that differences are slight but often determinable. Tender liver and palpable spleen are rare in the former, leukocytosis and normal differential count are the rule in the former instead of leukopenia as in the latter.

**ETIOLOGY**—Among other causes of toxic jaundice in addition to arsphenamin, reports appear of cin-

chophen and other quinolin preparations, atophan, etc. Acute yellow atrophy of the liver led to fatal results in a number of cases.

**TREATMENT**—Further reports continue to confirm the beneficial and often curative results of splenectomy in hemolytic icterus, especially the congenital variety. Given the diagnosis, therefore, the treatment is well outlined. As a modification P. Valdoni (Il Policlinico 36:137 (Mar 15) 1929) ligated the splenic artery with good results. All of the reports indicate a return to normal of the blood picture and the clinical syndrome.

**JAW.—DEFORMITIES.—PROGNATHISM—Treatment.**—In 7 cases G. Schmidt (Deutsche Ztschr. f. Chir. 215:212 (Mar) 1929) successfully corrected this condition by an operative transverse division of the inferior maxilla just below the temporomandibular notch, and sliding backward the distal segment of the mandible.

**INFERIOR RETROPROGNATHISM—Treatment**—Failure of the lower jaw to develop occurs in marked form when there is temporomandibular ankylosis in infancy. Usually the chin shows marked retrusion. L. Dufourmental and M. Darcissac (Bull. et mém. Soc. du chir. de Paris 20:750 (Nov 2) 1928) refer to 2 operations for widening the lower jaw, which they described in 1924: (1) Median osteotomy with introduction of a bone graft, and (2) a "staircase" osteotomy followed by separation of the 2 halves without the use of a bone graft. In one case, the protruding superior maxilla was resected at the expense of the anterior teeth which were replaced by an

artificial denture To increase the correction, an operation was done on the joints, the external lateral ligament being cut, and a piece of the eighth costal cartilage inserted behind the condyle The uncut external pterygoids tended to hold the jaw forward Dislocation did not occur and mastication became nearly normal after the operation

F. Trauner's patient (Zentralbl f Chir 56 1986 (Aug 10) 1929) was 32 years old and had lost both condylod processes from previous operations The stump of the mandible was very painful and habitual luxation toward the left side occurred on the slightest opening of the mouth Under local anesthesia, a portion of bone, broad and thick enough to support 2 perforations was separated from the chin but left attached to a pedicle of soft tissue The remaining part of the lower jaw was divided 0.5 cm to the left of the symphysis as a separation directly at the symphysis leads to the formation of a pseudoarthrosis Both parts of the lower jaw were then pulled apart and held in a separated position by wire sutures fastened to the lower segment of the jaw Later a new deviation of the jaw occurred, and the joints were, therefore, opened, smoothed, a meniscus on the right side removed and a transplant of tissue obtained from the thigh, interposed This gave a satisfactory functional result

Unilateral shortening of the mandible, causing a deformity similar to that found in ankylosis but without limitation of the movement of the jaw, is considered by R. H. Ivy and L. Curtis (J Bone and Joint Surg. 10 645 (Oct) 1928). Usually it occurs in childhood, as the result of

osteomyelitis and necrosis, or less frequently as the result of fracture or the operative removal of a section of the mandible for tumor The function and appearance in such cases can be greatly improved by osteotomy or sufficient division of scar tissue to bring the chin forward and to the midline, followed by elongation of the shortened side of the jaw by bone grafting The 2 most suitable forms of bone graft for the mandible are a periosteal graft from the tibia and a thick graft from the crest of the ileum

In a boy of 14, who had a shortening of 2 cm, mainly in the ramus, a section was made in the left side of the jaw, in the first molar region, and the gap subsequently filled by a bone graft, the teeth meanwhile being held in occlusion A flattening of the right side was later made more symmetrical by placing a bone graft on the outside of the body of the jaw This type of deformity has also been considered by Blair, Kazanjian, Lindeman, Bruhn and Pilcher In a second patient, 28 years old, R. H. Ivy (Ann Surg 87 596, 1928) found non-union of an old comminuted fracture of the mandible with a 2.5 cm loss of substance on both sides Retrusion in this case had been prevented by fixation of the lower to the upper teeth By a bone graft from the iliac crest on the left side and strips of osteoperiosteum on the right, bony continuity was restored The chin was built forward by a costal cartilage transplant, and the depressions on the sides of the ramus were filled in by fascial strips put in subcutaneous pockets On the left side, a later reinforcement by a strip

of osteoperiosteum from the tibia was required

**TEMPOROMANDIBULAR JOINT.**—The x-ray demonstration of the temporomandibular joint has always been difficult. P. A. Bishop (Am J Roentgenol 21 556 (June) 1929) places the patient in the position usually required for examination of the lateral skull. At a distance of 24 inches (61 cm) from the uppermost joint, the tube is shifted toward the top of the head for a distance of 9 inches (22 cm) and then angulated 30° downward toward the joint. Stereoscopic films may be made with this technic. Not only may lesions due to trauma be demonstrated, but also ankylosis, effusion into the joint, and destruction from malignancy.

**OSTEOMYELITIS IN INFANTS,** involving the superior maxilla, is rare. Panzel found 7 cases among 15,000 patients. J. Terracol (Arch internat de laryng 34 532 (May) 1928) has seen 2 cases, and believes that the portal of entry of infection is the mouth, and in some cases, the antrum. According to Broca, the zone of the growth of the teeth plays a part similar to that played by the epiphyseal cartilage of the long bones. The gingivitis associated with eruption of the teeth is followed by folliculitis, and the folliculitis by osteitis, and the whole bone may become involved.

**DIAGNOSIS**—M. H. Bass (Am J Dis Child 35 65 (Jan) 1928) reports 2 cases due to the *Staphylococcus aureus*, and believes the condition presents a definite clinical syndrome. Usually, between the second week and ninth month of life, the child suddenly develops redness and swelling

of the lids and the periorbital tissues of 1 eye with a purulent conjunctivitis and exophthalmos. As a rule, localization occurs below the inner canthus of the eye, the abscess rupturing and leaving a discharging fistula on the face. A nasal discharge appears on the affected side. Swellings are seen on the upper gum, usually about where the canine teeth will erupt, and also upon the hard palate which rupture spontaneously or require incision. From these sinuses creamy pus is discharged, containing particles of bone and unerupted teeth. When the alveolar sinuses are probed, the instrument enters a large cavity, on the walls of which bare bone is found. The entire process requires only a few days, the infant being very ill, the temperature irregular, convulsions frequent, and there is marked anorexia and difficulty in nursing, due to the pus in the nostril. The lesion may heal with or without the persistence of discharging sinuses or the development of secondary purulent foci, or death may result before the secondary foci have had time to develop.

**TREATMENT**—A small incision should be made when the process points in the face or on the mouth. The eye must be protected by compresses and frequently cleansed.

Terracol (*loc cit*) also advises early operative drainage, preferably through the mouth, and the use of vaccine. Except for the loss of some of the permanent teeth, the final result is often very good. The canine and premolar are most frequently lost. Septicemia with multiple visceral localizations may occur. Incisions should be made without anes-

thesia or only a small quantity of a local anesthetic

#### TUMORS. — ADAMANTINOMA —

Adamantinomata are not uncommon. They arise most often in the lower jaw from the paradental epithelial debris or the enamel organ and are often confused with bone cysts, benign giant-cell tumors, or carcinomata. Similar tumors may occur in the hypophyseal region, and as the epithelial cells differentiate to a greater or less degree, the tumors vary in their appearance. Grossly, the tumors appear as multiple cysts centrally placed which gradually expand in the jaw, and destroy the cortex. Although usually considered benign, they have an epithelial origin and are potentially malignant. Two of 12 cases reviewed by C. C. Simmons (Ann Surg 88 693 (Oct) 1928) showed definite glandular metastases late in the disease—in 1 occurring 14 years after the onset. The tumors are of slow growth, one patient dying from local extension and sepsis after 2 years, while another had a tumor of the same type removed 23 years after the first operation. Four of the patients were male, the age at onset was between the ages of 13 and 73 years. The upper jaw was affected in 3 cases and the lower in 9. The x-rays showed a characteristic picture with central destruction, and single or numerous cysts, with or without complete absorption of the bone. The disease may be confused with benign giant-cell tumor, odontoma, dentigerous cyst, or osteomyelitis. It causes no characteristic subjective symptoms. If the bone has been destroyed, a fluctuating cystic area will remain. The diagnosis is usually based on the history of a

long-standing tumor, and the presence of a central cyst is suggestive.

**TREATMENT**—Contrary to the prevailing idea, conservative operations are unsatisfactory. In all of 10 cases in which a conservative operation was performed, a recurrence developed. Two of the patients died from local extension and sepsis, and 1 from metastases. In the light of these results, the appropriate treatment would seem to be wide resection of the jaw. In the case of women and young persons, conservative operation may be done if the patient will agree to submit to frequent examinations and to radical operation on recurrence. A radical operation, however, should be urged if the tumor is large or if the cuboidal type of cell predominates, as this is probably the more malignant form of growth. After resection of the jaw, a prosthesis may be used or bone grafting done.

After an operative exarticulation of half of the jaw for an adamantinoma, E. Bergenfeldt (Acta Chir Scandinav 64 47 (Apr 23) 1929) used a Schroeder prosthesis of hard rubber, the permanent prosthesis was provided with a hinged joint according to the Ernst method. The end-result of the operation was good from both the cosmetic and functional standpoint.

**CYSTS**—The most common cysts of the jaws are the root cyst, the follicular cyst, and the multilocular cyst or adamantinoma polycysticum. These are derived from the epithelial cells of the dental anlage. Two cases of unusual type are reported by J. Schroff (Laryngoscope 39 173 (Mar) 1929). In the first, epithelial strands or cell rests from the nasopalatine

duct in the foramen incisivum gave rise to a cyst in the median line of the maxilla which simulated a root or follicular cyst in that region. In the second case, a cyst was formed from epithelial cell rests in the region of fusion of the upper jaw and the lateral and middle nasal processes. Such cysts are situated partly in the vestibule of the mouth, nose and cheek. They may simulate dental cysts, but are distinguished from the latter by the fact that they occur on bone and not in bone. The usual classification of cysts of the maxilla should be amplified to include these varieties.

**CHORDOMA** of the superior maxilla, in a child aged 24 hours, which projected from the mouth and prevented nursing and was excised is described by S. Rubaschow (*Zent f Chir* 56 137 (Jan 19) 1929). It was found on a pedicle which sprang from the alveolar margin in the middle of the superior maxilla. A microscopic examination proved it to be a typical chordoma.

**JOINTS —GENERAL CONSIDERATIONS** — E. Deutsch (*Wien klin Wchnschr* 42 1287 (Oct 3) 1929) says, in a case of tuberculosis of the joints, the articular process is generally secondary. In lymph node (bronchial) involvement the articular process is usually less severe than in the pulmonary variety. If the kidney or other viscera are tuberculous, the prognosis of the joint or bone infection is unfavorable. In children the articular tuberculosis is sometimes primary, that is why the prognosis is usually favorable, another reason being that the process is circumscribed. The recovery requires less

time in osteal than in joint tuberculosis. Suppurative processes have an unfavorable prognosis, if fistula exists the patient is in danger of mixed infection. As a rule, tuberculosis in the upper extremity is recovered from more rapidly than in the lower. The causes for a fatal outcome in tuberculosis of the bones and joints are given as follows: Progressive pulmonary process, tuberculous infection of other organs, development of miliary tuberculosis, tuberculous meningitis, amyloid degeneration, generalized sepsis and non-tuberculous complications of other organs, especially of the heart, kidney or pancreas.

**DEFORMITIES —CLUB-FOOT** — *Etiology* — M. Böhm (*J Bone and Joint Surg* 11 229 (Apr) 1929) believes after careful study and investigation that club-foot of the congenital type is due to a primary endogenous disturbance of the embryo, *i e*, an arrest of development from a cause as yet unknown.

*Treatment* — H. Kraske (*Deutsche Ztschr f Chir* 203 499, 1927) has adopted a method of **elastic reduction** in club-foot. In very early cases, **manipulation and bandaging** is all that is needed, in later cases a **celluloid shoe and leg piece**, arranged with hooks on the outer side to which springs of gradually increasing tension are attached, are used. The writer claims that the constant tension will in time correct the deformity.

E. D. W. Hauser (*J A M A* 93 668 (Aug 31) 1929) describes a method of non-operative treatment by the use of ingeniously shaped **wooden foot plates** (fully illustrated in the original article). The foot is first reduced by manipulation either fol-

lowed by a short period of casting or else immediately bandaged to the wooden foot pieces. He claims very excellent results.

C H Heyman (Surg Gynec Obst 49 706 (Nov ) 1929) reviews 15 cases operated upon by the **Ober technic**, as follows. A J-shaped incision is made beginning posterior to the internal malleolus, extending downward and curving anteriorly to the scaphoid bone. The flap is retracted upward and anteriorly, exposing the deltoid ligament and the calcaneoscaphoid ligament, the former being completely severed from its attachment to the malleolus and detached subperiosteally from the os calcis, astragalus and scaphoid. The varus in the heel, as rule, can now be corrected. The thickened astragoscaphoid capsule and the calcaneoscaphoid ligament are now divided. This should permit eversion of the foot. If the tibialis posticus resists inversion this should either be tenotomized or lengthened. If abduction of the forefoot continues, the adductor hallucis is cut through near its attachment to the os calcis. The foot is now forcibly manipulated to a maximum degree. Finally, the tendo Achilles is exposed by the retraction of the tissues posteriorly and it is lengthened. The foot is now placed in a somewhat correlated position for several days, but full overcorrection should not be attempted before that time, because of the effect on the circulation.

**FLAT-FOOT**—*Treatment*—J Seifert (Zentralbl f Chir 56 1419 (June 8) 1929) has his patients stand barefoot on a flat surface and then asks them to raise themselves on their toes. If this can be done, the foot is

still flexible and may be helped by **exercises and massage**. If they cannot raise themselves, the bones have undergone changes and the flat-foot is established, in which event, **redressement** or **open operation** is necessary. [**Redressement**—general anesthesia, manipulation of foot until it is easily placed in varus with arch restoration, cast in this position for 4 to 6 weeks. Then treat as a flexible flat-foot, **wedge** the shoes on the inner side, walk with toes straight ahead, **exercises and massage**. The **sinusoidal apparatus** has been beneficial. So far, we have never found open operation either indicated or satisfactory—Ed.]

F Schede (Jahresk f artztl Fortbild 19 22 (Dec ) 1928) states that flat-foot is not a local process, but is always based upon a constitutional weakness of the supporting tissues. Faulty posture of the foot leads to faulty shape. The most common factor in flat-foot, is a rachitic tendency particularly in young children. **General treatment, exercises and massage** should be given early. [Toe-dancing, skipping rope, all exercises to be taken on the toes—never in the flat footed position—proper foot gear, education in proper method of walking, combined with the usual anti-rachitic regimen, will be found valuable—Ed.]

**HALLUX VALGUS**—W K Hughes (J Coll Surgeons, Australasia 1 214 (Nov ) 1928) thinks that an obstacle to correction is the contraction of the skin and soft tissues between the first and second toes and the lateral metatarsophalangeal ligaments of the great toe. He divides these structures completely and at times a skin graft is necessary to close the gap

All exostoses are removed and misplaced sesamoids excised. The big toe is then bandaged in an over-corrected position and the patient allowed to walk as soon as the flap is adherent

E D McBride (J Bone and Joint Surg 10 735 (Oct) 1928) describes an operation that he claims is suitable to all cases except those with changes in the articular surface, hallux rigidus or marked deformity. 2-inch incision along the lateral border of the extensor hallucis longus, the center being over the metatarsophalangeal joint of the great toe, dissect structures away until the conjoined tendon of the adductor hallucis group is exposed, sever it from its insertion, but do not permit it to retract. Then dissect out the sesamoids, if necessary, being careful not to destroy any more tissue than is absolutely needed. The conjoined tendon and the external head of the flexor hallucis brevis are now transplanted into the dorsum of the head of the first metatarsal bone. Now retract skin medially and remove the exostoses on the medial aspect of the first metatarsal head, toe is corrected and capsule repaired, wound is closed. Light plaster-of-paris slipper applied, remove in 10 days, thereafter hold toe in over-correction by adhesive strips for from 4 to 6 weeks. Weight bearing is permitted after the second week post-operative. [Personal experience with this procedure has not proved its advantages over removal of the exostoses and subcutaneous section of the tissues between the first and second toes. A tourniquet is essential for success in the McBride procedure—Ed]

M Brandes (Zentralbl f Chir 56

2434 (Sept 28) 1928) has performed over 100 resections of the proximal two-thirds of the first phalanx of the great toe, under local anesthesia. He claims that it gives good anatomical and functional results. None of the other structures are disturbed, except the exostoses on the medial side of the head of the first metatarsal, and these are chiseled off. After resection, the toe is placed in slight plantar flexion, to overcome skin foldings and necrosis and the whole foot is put in slight plantar flexion and adduction. A plaster-of-paris foot plate is applied. Stitches are removed on the eighth day and all dressings removed on the eleventh day, the patient walking on the fourteenth day. Before this, however, a light zinc oxide dressing is applied to the metatarsal region. Passive movements of the foot, hot foot baths and massage are important factors in the after-treatment.

**HALLUX RIGIDUS**—When dorsiflexion is lost and about 45° of plantar flexion remains, G P Mills (Am J Surg 6 443 (Apr) 1929) does a cuneiform osteotomy, base upward, on the neck of the first metatarsal bone. Keep behind the exostoses. The gap should be closed by dorsal flexion of the toe. If the exostoses are bad they may be removed. [Why not remove them before the osteotomy, while the head of the bone is still stable—Ed] Weight bearing in plaster boot as soon as the wound is healed. In actual complete fixation the operation is useless, then completely excise the metatarsal head, if enough is taken off one does not need to transplant the bursa. [Weight bearing is, of course, interfered with and a bad foot will result. We have obtained good results by resection of

the exostoses and a small part of the head, with either **bursal transplantation** or **Baer's membrane** (chromicised pig's bladder) and early **passive motion**—Ed] If operation is refused or contraindicated, a clever boot maker can generally give comfort by hollowing out a groove in the front of the great toe (sole of shoe) and fixing a thin **metal plate** in the inner side of the sole

J Fraser (Brit M J 1 383 (Mar 2) 1929) suggests raising the heel and correcting any accompanying flat-foot. Manipulation should be done under **anesthesia**, followed by **plaster fixation** for several days in the dorsiflexed position. A better procedure is the use of a **sole splint** of metal to prevent flexion during walking. The best surgical procedure is the **excision** of the base of the first phalanx and the insertion of the bursa

**HAMMER TOE**—*Treatment*—J Fraser (Brit M J 1 383 (Mar 2) 1929) advises an incision over the prominent joint [usually the proximal interphalangeal—Ed] and a wedge shaped piece of bone, base toward the dorsum, from both articular surfaces is excised. An aluminum splint should be worn until the toe is ankylosed [This is the older type of resection and has little or no advantage over resection of the head of the proximal phalanx. This latter procedure is quicker and we believe much easier—Ed] If operation is refused, "cradle" strapping may be used, one strap of adhesive being passed over the first phalanx of the hammer toe and under the first phalanges of the adjacent toes. A second strap should be placed under the second phalanx and over the adjacent toes

**KNOCK-KNEE**—*Treatment*—K Reschke (Beitr z klin Chir 145 163 (Nov 23) 1928) drives ivory pegs into the bone for the purpose of stimulating epiphyseal growth. He obtained good results in 7 of 8 cases, between 16 and 18 years of age, but this method is not applicable to young patients. Three or 4 pegs are driven into the outer side of the femur just above the epiphyseal cartilage, directed downward toward the cartilage, and similar pegs are placed in the upper end of the tibia, directed upward toward the cartilage. The pegs must not, however, touch the cartilage or even lie close to it, and the outer end must not be flush with the bone, as a little protrusion is a powerful stimulus to periosteal growth

**DISPLACEMENT OF THE UPPER FEMORAL EPIPHYSIS**—C E Badgely (J A M A 92 355 (Feb 2) 1929) has studied 27 cases of this injury and divides them into 5 groups (1) Cases of separation without displacement, (2) early cases of displacement, (3) advanced cases, (4) healed cases in young adults, and (5) old cases with osteoarthritic changes. In the *first group* he applies a bivalved hip spica, in abduction and slight external rotation, this is to be worn 6 weeks. **Physical therapy** and **exercise** are started early after the cast is applied and continued until the patient is discharged. *Group 2* is placed in wide abduction with a solid spica cast for 3 weeks, then the cast is bivalved and **baking** and **massage** is given. After 6 weeks, **exercise under water** is given, at the end of 8 weeks a **walking caliper** is applied which is worn for 2 months and then discarded gradually. *Group 3* are treated by operative procedures to correct the mal-



alignment of the head and neck, some type of **osteotomy** being the operation of choice. In *group 4* some of the epiphysis may be replaced, but this is usually impossible, and then the best procedure is one of the **reconstruction** operations. *Group 5* is treated by **fusion**, *i.e.*, intentionally ankylosing the hip joint either by destroying the remaining joint elements and applying raw bone to raw bone, or else by the insertion of a bone graft outside the joint. **Fixation** of the hip in a spica, without operation, may give temporary relief.

**OSTEOCHONDRITIS (PERTHES' DISEASE)**—C L Pattison (Brit J Surg 16 89 (July) 1928) states that this condition causes from 3 to 5 per cent of all cases of hip joint affections. It usually occurs between the fifth and tenth years and is more common in males. It is probably not hereditary and is not associated with rickets or syphilis. As a rule it is unilateral. It has been ascribed to infective, developmental and traumatic causes, but none of the theories so far advanced are entirely satisfactory. The main symptoms are a limp and a variable amount of pain, usually associated, in the early stages, with muscle spasm. Limitation of movement depends upon the muscle spasm and is inconstant. The x-rays show an increased density in the femoral head with a decrease in size of the bony nucleus of the epiphysis. These changes are followed by fragmentation of the nucleus, a stage of repair with coalescence of the fragments, and a stage of molding of the reformed femoral head. The greater the deformity produced the less favorable the *prognosis* as to ultimate function. *Treatment* is usually best by

**fixation and prohibition of weight bearing**, continued from 6 months to 3 years, according to the rate of recalcification. He states that the disease is self limited and complete incapacity never results, whatever the treatment. [These hips frequently cause trouble later in life, being prone to secondary arthritic manifestations that cause marked disability—Ed.]

B Chatzkelson (Zentralbl f Chir 55 209 (Jan 28) 1928) states that a symptom of coxitis outside the joint is the "decalcification" of the bone in the diseased half of the pelvis. This may be present even in the earliest stage of the process and can be demonstrated by percussion of both the anterior superior spines, there being a tympanic note on the affected side and a duller tone on the healthy side. In the later stages, due to the deposition of calcium salts, the result is gradually reversed. [If these observations are correct, there should never be any difference in the note on either side in Perthes' disease—Ed.]

**SYNOVIAL OSTEOCHONDROMATOSIS**—F Bohm (Deutsche Ztschr f Chir 212 275, 1928) reports a case, 30 year old, in which the right knee was crushed 6 months previously. The accident was followed by swelling and pain. The chief clinical finding was loss of extension. An x-ray examination, confirmed at operation, showed 10 bodies, ranging in size from a pea to a bean, lying free in the joint. The condition occurs most frequently in the knee and the elbow of young males. There are no typical clinical symptoms, later there may be symptoms resembling joint mouse or chronic arthritis. The treatment is **operative removal**.

T Beckman and G Ivarsson (Acta

chir Scandinav 63 551 (July 5) 1928) report a *chondroma* in the capsule of both knee joints in a female age 50. Operative removal was followed by cure and a functional joint. P Rostock (Beitr z klin Chir 144: 58 (Aug 31) 1928) observed 6 cases and analyzes 61 others, 35 in the knee, 11 in the elbow, 6 in the hip, 3 each in shoulder and hand, 2 in the foot, 1 in the metacarpals. The ages varied from 11 to 80 years. The treatment varied with different operators from **arthrotomy** to **resection**. Recurrence was noted in 10 cases. The number of pieces of cartilage removed varied from a few to 1047 separate pieces. R Janker (Deutsche Ztschr f Chir 211 135, 1928) reviews the literature and adds 9 personal cases. He recommends as the operation of choice either **partial** or **complete synovectomy** (opening the joint, gaining wide exposure and excising all of the synovia). Extra-capsular resection or amputation is not justified.

**SYPHILIS —DIAGNOSIS** —L A Tamini (Rev méd latino-am 13 951 (Mar) 1928) considers the essential site of the disease to be in the bone. The arthralgia manifests itself quite early, frequently in the second stage, and affects co-incidentally numerous large joints. It is frequently confused with rheumatic affections and so-called growth pains. The syphilitic pseudo-rheumatism occurs in the second stage, manifested as an infectious arthritis. Characteristic is the subacute, almost feverless, type, with severe pain and nightly exacerbations, but without disturbance of the general constitution. It will affect 2 or 3 joints and pain is not increased on movement. Skin and

mucous membrane manifestations are to be noted at the same time. A purulent form is observed in nursing infants—the hereditary pseudo-paralysis, *Parrot's disease*. Schlesinger (Die Aertzl Praxis (June) 1928) states that the sternoclavicular and sternocostal joints are frequently the site of election. The blood Wassermann is often negative, but the joint fluid obtained by aspiration will give a positive reaction.

**TUBERCULOSIS. —TREATMENT** —O Fliegel (Deutsche med Wchnschr 54 2053 (Dec 7) 1928) believes that a **spleen diet** is of great importance. He reports observations in 20 cases, all of which were of serious nature and showed complications. The orthopedic treatment was combined with the dietary measures. Calf spleen may be administered in the form of quickly fried collops, or ground in soups, 2 to 4 ounces (60 to 120 Gm) of the spleen being given daily. The treatment was continued for 4 weeks, interrupted for 2 weeks, and then resumed again. Five patients showed complete local healing and 8 were generally improved.

In the treatment of joint lesions in which the diagnosis is obscure, C E Jancke (Zentralbl f Chir 56 1036 (Apr 27) 1929) resorts to **exploratory arthrotomy** and cites 13 cases in which the procedure proved of value. No untoward results occurred and in several cases healing appeared to be stimulated. On examination of some of these cases 1½ to 5 years later, the author found normal joint motion and the patients free from discomfort. In no instance had joint tuberculosis developed. [The latter statement is rather significant, had they been tuberculous in the first place,

the chances for sinus formation and consequent marked joint disturbance would have been excellent. A tuberculous joint can never be opened with the same sense of freedom as a tuberculous abdomen. We have never seen a case where we felt it desirable to perform diagnostic arthrotomy — Ed ]

### SPECIAL JOINTS —ANKLE—

Under the name of *traumatic subastragalar arthropathy*, 4 cases, are reported by D S O'Connor (New England J Med 200 987 (May 9) 1929), all of which resulted from falls from a height. There was no evidence of fracture of the os calcis. The characteristic features were tenderness on pressure over the subastragaloid joint, inability to place the full weight on the extended foot, and pain in walking on uneven surfaces. **Casting**, with absolute prohibition of weight bearing, may be tried at first, later **arthrodesis** may be considered. [It is wise in these cases to look for fracture of the astragalus as well as of the os calcis. The fracture may be of the crushed type and escape notice on an immediate radiograph, when another x-ray examination 3 to 4 weeks later will disclose the bone injury. The treatment as advised is the best known at this time —Ed ]

**ELBOW** —Siwon (Deutsche Ztschr f Chir 209 338 (June 28) 1928) traced elbow *ankylosis* through 4 generations. In the first 3 generations the males passed the deformity along to the female offspring. Two of these remained unmarried. The third, married a healthy man, with no anomalies, her daughter inheriting the *ankylosis*.

G P Mills (Brit M J 1 12 (Jan 7) 1928) cures *tennis elbow* by simple

manipulation carried out under **nitrous oxide anesthesia**.

R Leriche (Lyon chir 25 459 (July-Aug) 1928), in order to obtain better exposure in elbow operations, divides the lateral ligaments temporarily and performs a posterior dislocation of the joint. Before the wound is closed the joint is rearticulated and the ligaments sutured. [This would give a very wide exposure for intra-articular manipulation in this joint. It might tend to give some slight lateral mobility that would weaken the joint in later years —Ed ]

**HIP** —G Herbst (Deutsche Ztschr f Chir 217 359 (July) 1929) reports 61 cases of surgical reposition of *congenitally dislocated hips*. It was necessary in most cases because of inability to reduce the dislocation by the usual manipulative methods or because there was a tendency to subluxation after reduction. In children up to 9 years of age the results were good, in older children and adults they were unsatisfactory in two-thirds of the cases. [Surgical reposition by the anterior incision over the hip joint, opening the contracted capsule and clearing the acetabular cavity with a large miller or by curette, with replacement of the dislocated head in the new cavity and passive motion after 2 weeks, should always be considered when the manipulative measures fail, a stiff stable hip is better than a dislocated unstable one —Ed ]

H O Feiss (Surg Gynec Obst 49 560 (Oct) 1929) describes a new type of apparatus to be used for retention after the hip has been reduced. It consists of a body piece, a thigh piece, and another piece to go about the upper portion of the leg, all

made of celluloid and held together by an iron strap. It has many advantages over the plaster-of-paris cast, it does not absorb excretions, it can be removed at times for cleansing and permits of free access to the parts at all times. It can be made by any competent brace maker.

J S Speed (J Bone and Joint Surg 10 202 (Apr) 1928) reports the end results of 100 cases of *flexion contracture of the hip*, the **Campbell modification of the Soutter technic** being used in cases in which the flexion exceeded  $20^\circ$ . An incision is made along the iliac crest, the entire crest with the anterior superior spine and all the muscles attached to them are chiseled off. An area broad enough to accommodate this mass is then prepared on the ilium slightly above the acetabulum, and the entire crest and attached muscles is then transplanted to the new location. The wound is closed and plaster cast applied in the fullest extension obtainable. Union occurs in from 2 to 4 months. The results are good.

F D Dickson (*ibid.*, 10 712 (Oct) 1928) describes an operation for *paralytic unstable hips* in which he utilizes the tensor fascia femoris, changing its function from an abductor and flexor into an abductor and extensor. Through an incision along the iliac crest, he removed the insertion of this muscle from its position just external to the anterior superior spine and changed it to a position on the crest of the ilium in the vicinity of the posterior superior spine, thus bringing the muscle posterior to the axis of the hip joint. He states that the procedure has been fairly satisfactory. [It is certainly a step in the right direction, as these cases are among some of the worst

cripples we are called upon to treat—Ed]

**TUBERCULOSIS OF THE HIP—Treatment**—J Taylor (Glasgow M J 110. 129 (Sept) 1928) reviews a series of cases treated over a period of 8 years by the method similar to that carried out at Berck-sur-Mer. This includes carefully graduated **irradiation** by both natural and artificial **sunlight** and **partial immobilization** of the hip joint. In cases admitted with deformity, **extension** was applied for gradual correction. In cases with dislocation or fixation of the head, **forcible manipulation** was resorted to and **fixation** applied. Although this method is held in disfavor by most authorities, Taylor considers it safe. When partial osseous ankylosis has resulted, correction was obtained by **osteotomy**. The results tabulated by the author show an increased number of movable joints and a decreased amount of shortening.

P W Roberts (Surg Gynec Obst 47 841 (Dec) 1928) describes a method for ankylosis of the hip joint. A tapered block, about 1 inch square on its superior aspect, is cut out from the posterior surface of the acetabulum and is put aside in salt solution. The lower extremity is then placed in the desired position of  $15^\circ$  abduction without rotation of the foot. The tapered opening in the acetabular rim is extended downward into the head of the femur, care being exercised to maintain the slope of the sides of the cut. The block of bone removed from the acetabulum is denuded of its articular cartilage and driven, with force, into the bed prepared for it. Fixation is then applied for the necessary period.

F H Albee (Ann Surg 89 404

(Mar) 1928) believes that **extra-articular arthrodesis** is indicated in cases of older children and adults, when the abduction deformity constantly recurs after long periods of conservative treatment, when it recurs after Gant's osteotomy because of incomplete ankylosis, when there is marked destruction of head or acetabulum or both, and when there are symptoms of active tuberculosis. In adults it is indicated when the bone destruction is moderate. For successful results the grafts must be of sufficient length and strength, they must fit accurately, and they must be carefully mortised at each end. The massive grafts are the best.

F C Kidner (J A M A 91 1865 (Dec 15) 1928) has operated upon 17 cases of hip joint tuberculosis by the **method of Hibbs**. The procedure consists of transposition and rotation of an osteotomized vertical wedge from the trochanter without removal of the muscle attachments, so that it has bony contact with its own stumps, with the roughened superior surface of the femoral neck and with a trap door groove in the side of the ilium. Fixation in a plaster spica is applied with the leg in abduction, to hold the graft against the ilium, for from 3 to 9 months. Weight bearing is begun usually after the sixth month. The only contraindication is the presence of fresh open sinuses. Excision of the head and intra-articular arthrodeses have failed because there is not enough healthy bone to form a firm union. In 12 of the 17 cases, firm bony union resulted, in 14 a good functional result was obtained. In all of these cases the progress of the disease and all symptoms have stopped.

The ages of the patients ranged from 4 to 14 years.

**JAW**—N Hamalainen (Acta chir Scandinav 64 493 (Apr 23) 1929) describes 7 cases of *ankylosis* of the temporo-maxillary joint, in which **resection** of the condyle or the upper part of the ascending ramus, followed by the **interposition** of a **free fat flap**, was performed. Special after treatment was not used. The movements of mastication were sufficient to prevent new ankylosis. Henry (Lancet (Sept 29) 1928) makes a **flap** from either the temporal fascia itself or from the fatty connective tissue covering it, for interposition between the neck of the mandible and the site of the glenoid cavity. The pedicle of the flap should have an oblique hinge. V P Blair (Surg Gynec Obst 46 167 (Feb) 1928) advises 3 procedures that may improve the appearance after the ankylosis has been treated. (1) The affected side of the mandible may be pulled forward and fixed in this position until it loses its tendency to recede. In unilateral ankylosis with a receding mandible, it may be necessary to section the ramus of the opposite side to obtain the best position of the body of the jaw. (2) A receding chin can be built out by the implantation of a piece of costal cartilage. (3) The facial obliquity remaining after fixing the jaw bone in its new position can be rendered less noticeable by shifting the soft tissues of the chin laterally or by filling the flat side of the jaw with cartilage or a combination of both methods. [The editor has included Blair's work from the standpoint of general information. It is his belief that some of the suggestions

should only be undertaken by a competent plastic surgeon—Ed ]

H B Knapp (J Michigan M Soc 27 798 (Dec ) 1928) reports a case of *loose cartilages in temporomaxillary articulation*, in a girl of 18, who, while yawning, apparently dislocated the jaw on the right side. The mouth was locked wide open, with excruciating pain in the right side of the face. Following reduction, the joint was swollen and tender. A day later the jaw again became fixed in the open position, and then became an almost daily occurrence. An operation was performed with the expectation of finding a relaxed capsule. This, however, was not found and the capsule was opened, 2 small pieces of cartilage, attached by a thin fibrous pedicle, were found. They were snipped off, the joint was closed, and a good recovery followed with no return of the original trouble.

**KNEE**—P Moulouguet (J Bone and Joint Surg 11 353 (Apr ) 1929) states that *foreign bodies* in the joints may arise from the synovial membrane the so-called *ecchondroses*, and those arising from the bone ends, the *osteophytes*. Foreign bodies due entirely to trauma are comparatively rare, but trauma is an important factor in the production of pathological processes giving rise to foreign body formation. The cure is the operative removal of the foreign body.

A M Rechtmann (Surg Gynec Obst 49 683 (Nov ) 1929) advises *pneumarthrosis of the knee* as an aid in more accurate diagnosis of *displacement of the cartilages, loose bodies and rupture of the crucial ligaments*. The injection is made in the x-ray room on the x-ray table without general anesthesia. Oxygen from an ordinary tank,

the gas passing through a wash bottle, is used. This is connected by rubber tubing to a glass connecting tip, which, in turn, is inserted into a needle of fairly large bore. The knee is carefully prepared, as for any major operative procedure. Local anesthesia may be used. The needle attached to the tubing is passed into the joint until it is beneath the patella, then the gas is slowly permitted to enter the joint until it is moderately distended. A hemostat is then applied to the rubber tubing closing the flow of gas. The necessary x-ray exposures are then made, the hemostat released and the knee deflated. A collodion dressing, with circular sheet wadding and flannel bandages is applied and worn for 3 or 4 days. In loosened cartilages there is a distinct separation of the gas shadow between the femur and the tibia at the site of the cartilage. He calls attention to dislocation of the external cartilage, diagnosed by this method, with subsequent removal and cure.

A case in which *tuberculosis* was followed by *sarcoma* is reported by W Jaruslawsky (Zentralbl f Chir 56 915 (Apr 13) 1929). A boy aged 3 was seen with typical knee joint tuberculosis which followed the usual course to the development of peri-articular abscesses. Ten years later, the patient was again seen following an injury to the knee. No relief being obtained, the extremity was amputated in the middle third of the femur. Pathological examination showed a giant cell sarcoma. The patient improved and was discharged but returned to the clinic 11 months later with lung metastases and shortly thereafter died.

Periodic *hydrarthrosis* was treated

by R Weismann-Netter (Bull et mém Soc med d hôp de Paris 53 909 (July 8) 1929) with subcutaneous injections of ergotamine tartrate. At first there was violent reaction and accentuation of the condition, but later cure resulted and so far there has been no recurrence

Immediate arthrotomy is the method of choice in the treatment of *torsion injuries* of the knee with bone lesions, according to R Leriche and J de Girardier (J de chir 34 1 (July) 1929), particularly where these bone lesions can be demonstrated by x-rays or by rapid recurrence of the hemiarthrosis. Opening of the joint gives an opportunity to reduce the bone displacements. In ordinary hemiarthrosis the arthrotomy should not be done

**TUBERCULOSIS OF THE KNEE**—O Jungling (52 tag d deutsche Ges-f Chir Berlin, 1928) reviews 124 cases, 23 being still under treatment. In each case a cast was applied and heliotherapy instituted. He believes that in the child this is the treatment of choice, although it must be used over a period of years, whereas in the adult resection of the knee is preferable in the fungous types. He thinks that the ill results from resection can be laid to the delay in operation

M S Henderson and H J Fortin (J Bone and Joint Surg 9 700 (Oct) 1927) analyze 211 cases treated surgically. A transverse skin incision is made over the knee, the joint exposed, and the synovia excised. The amount of bone removed from the femur and tibia depends upon the angle in which it is desired to place the extremity. The bone surfaces are fixed together by 2 wire nails, and the can-

cellous bone removed from the condyles of the femur are used as grafts on the lateral and anterior aspects of the joint. A cast extending from the toes to the groin is applied and the extremity suspended for 3 weeks, at the end of that time the nails are removed. Non-union occurred in 9 per cent. Amputation was necessary in 2.5 per cent, while 88.3 per cent secured firm bony union with good function. The operation relieves the pain and restores them to fairly good functional life

**SACRO-ILIAC JOINT**—F G Hodgson (South M J (Oct) 1928) calls attention to a condition that in the present furore about sacro-iliac injuries is like a breath of fresh air. He has observed 4 cases in which there was gross *displacement of the articulation*, proved by radiograph and could be easily felt with the hands. The condition still persists but none of the patients have any of the low back pain or referred sciatic pains so frequently associated with sacro-iliac conditions. He believes that the theory of sacro-iliac strain, relaxations, subluxation or dislocation as the chief causative factor in cases of low back pain and sciatica will not hold true in all cases. [We can agree with the author, having seen the sacro-iliac joints torn apart on several occasions and not finding any marked disability as a result, one can question a great many of the diagnoses of trouble in this articulation. There is an increasing sentiment among orthopedic surgeons that this joint is frequently blamed when it is not the offender. Unless the x-rays show definite pathology, it is questionable whether true sacro-iliac pathology exists.—Ed ]

A D Laerte (J Bone and Joint Surg 10 718 (Oct) 1928) describes a method of **fixation** of the sacro-iliac joint. A curved incision, 5 inches long, is made, beginning above the posterior superior spine and extending obliquely downward over the joint. The soft tissues are dissected down to the joint. A hole 9 mm in diameter and 3.5 cm deep, is bored into the joint about 1 inch above the posterior superior spine, the drill entering between sacrum and ilium and pointing in an outward and downward direction. A hole is bored about 1 inch below the posterior superior spine, the drill pointing in an upward and outward direction. Dowel grafts from the tibia are driven into

the holes. The wound is then closed and plaster fixation applied.

In *relaxations* of these joints E A Rich (*ibid* 10 415 (July) 1928) suggests the injection into the joint cartilages of 5 to 15 minims (0.03 to 0.9 cc) of "supersaturated" **tincture of iodine**, the resulting irritation securing firm fixation. To secure bony fixation in lower spinal conditions he advises the use of a "**shot-gun**" bone graft. A 7-inch graft is implanted into the spinous processes of the lower 2 or 3 lumbar vertebræ, into the external lateral crest of the sacrum, thence in a groove across the lower portion of the sacro-iliac joint just above the posterior superior spine.

## K

**KAHN TEST**—At the League of Nations conference on laboratory tests for **syphilis**, as reported by R L Kahn (J A M A 93 351 (Aug 3) 1929), it was recommended that at least 2 sero-diagnostic tests be done to obtain the most reliable information.

Reports from many countries and individuals all agree fairly well in the statement that the Kahn test is somewhat more reliable than the Wassermann especially when treatment is instituted early in the course of the syphilis.

Numerous slight or greater modifications have been proposed, all based on the flocculation phenomena, but more time must elapse before their relative merits are determined.

**KALA-AZAR OR LEISHMANIOSIS.—ETIOLOGY.**—The transmission of kala-azar is probably

by the sand flea of the species of *phlebotomus* according to C M Wenyon (Brit M J 2 558 (Sept 29) 1928).

**DIAGNOSIS**—Blood serum from cases of leishmaniasis has been shown by S Fabris (Pediatria 36 5 (Jan 1) 1928) to yield a white ring reaction when brought in contact with 0.5 to 1 per cent solution of urea antimony compounds, while the serum from patients with other diseases was negative.

Serum changes were also studied by B B Loyd and S N Paul (Indian J M Research 16 203 (July) 1928). They found that the white gel occurring when formalin is added, is not specific, but is a useful clinical test. In this disease an increase was shown to occur in the serum globulin content and of the euglobulin reaction, together with absolute decrease as regards the serum albumin. The authors found, by plotting curves for these changes, that a characteristic



form was assumed. They believe that on these lines a serological standardization is made available for the control of treatment.

The diagnosis is positively made through puncture of the bone marrow (the tibia), rather than the spleen, according to R. R. Jemma (*Pediatrics* 37: 113 (Feb. 1) 1929).

**TREATMENT.**—Treatment by Jemma (*ibid*), as is generally used, consists of antimony and potassium tartrate.

Urea-stibamine has been used in the treatment of this disease by A. C. Chatterjee (*Indian M. Rec.* (Feb.) 1926) with 5 deaths out of 18 cases treated. Previously reported individuals treated with this drug showed a very high percentage of recovery.

**KERATITIS.—INTERSTITIAL.—ETIOLOGY.**—W. P. Ling (*Arch. Ophth.* 1: 207 (Feb.) 1929) reported a case of interstitial keratitis in a 14-year-old boy who undoubtedly had congenital lues. As a Mantoux test was positive, tuberculosis may also have been a factor in the eye condition. The left eye alone was intensely inflamed. Enucleation done as specific treatment brought about no improvement. In the pathological examination of the removed eye neither spirochetes nor tubercle bacilli could be found.

For a long time there has been disagreement as to the presence of treponemata in the cornea in cases of human interstitial keratitis due to lues. C. A. Clapp (*Am. J. Ophth.* 11: 527 (July) 1928) has investigated the problem, but aside from demonstrating a better method of producing interstitial keratitis experimentally without secondary infection and panoph-

thalmitis, he obtained no conclusive evidence from his series of experiments. Treponemata were not found in rabbits in which interstitial keratitis was produced.

**TREATMENT.**—R. V. Morledge (*Colorado Med.* 26: 266 (July) 1929), in reporting 6 cases of interstitial keratitis strongly recommends treatment by malaria. He found that the inflammatory symptoms were gone after the end of the period of chills and that there was a marked clearing of the cornea and improved vision.

**NEUROPARALYTIC.**—Having ligated the carotids of 1 side for a radical extirpation of the larynx in a man presenting an epithelioma of that organ, J. M. Alonso and A. Isola (*Rev. d'oto-neuro-opht.* 6: 433 (June) 1928) were able to observe some manifestations which may furnish data for discussion of the origin of neuroparalytic keratitis.

From their observations these authors conclude that (1) paralysis of the trigeminus does not seem to be the cause of neuroparalytic keratitis, which is seen only when the process originates in the Gasserian ganglion or its ophthalmic division and is accompanied by alterations in sensation. Clinical observation seems to show that changes in the trigeminus as the result of nuclear or central lesions are not accompanied by neurotrophic keratitis. (2) The trophic functions of the cornea seem to be under control of the sympathetic. (3) From these facts one may possibly differentiate the sensory and trophic nerve supply of the cornea.

**TRACHOMATOUS.**—B. Adamantidis (*Ann. d'ocul.* 165: 119 (Feb.) 1928) has noticed that in certain patients, particularly infants, a latent

trachoma becomes apparent during the decline of an acute conjunctivitis. The course of this acute condition was much longer in trachomatous subjects, and favored complications of the cornea or aggravated existing ones. This ulcerative keratitis caused by a superinfection of the trachoma by Weeks' bacilli, differs from other forms of keratitis in the following characteristics. The ulceration, always due to this bacillus, occurs in debilitated cases, and is limited to the middle of the cornea on the horizontal meridian. It is in the form of a furrow, very deep in the center and less so on the 2 sides, perforation always occurring in the center.

The *prognosis* is very grave, though with continuous and systematic treatment it is not hopeless. The author recommends daily cauterizations with a 1 per cent solution of **silver nitrate** after careful eversion of the lid, instillations of **pilocarpine** or **argyrol**, and **compress** dressings. At first owing to the lachrimation these dressings should be changed 4 or 5 times daily, the instillations being then made, and an antiseptic ointment applied. In obstinate cases subconjunctival injections of **mercury cyanide** may be given combined with **parenteral** injections of milk.

**TUBERCULOUS** — Prosper Veil (Clin opht 32 75 (Feb) 1928) has reported a case of sclero-keratitis of long standing in a young girl 21 years of age. Her family history was tuberculous. Inoculation with **anti-tubercular vaccine** of Vaudremer resulted in rapid relief of painful symptoms, disappearance of the majority of the ocular lesions, and a beneficial reaction on the general condition.

**KERATOCONUS.** See CORNEA

## KIDNEY.—PHYSIOLOGY —

Contractions of the kidney, as shown by pyeloscopy, are described by J Leon Jona (M J Australia 2 118 (July 28) 1928). There seems to be a regular rhythm as follows. A contraction of the upper, middle and lower calices in fairly rapid succession, an interval of 1 to 3 seconds between each calyx contraction, succeeded in a few seconds by a relaxation of that part of the pelvis in relation to the calices, this then contracts forcing the fluid into the distal part of the pelvis, the latter contracts almost at once with a snap action, forcing a "globule" into the ureter. This globule is then passed down the ureter by an ordinary peristaltic wave of relaxation, followed by a wave of contraction. Pituitary extract, when injected intramuscularly, tends to speed up the entire sequence of events. The author thinks that many problems of physiology and pathology, more particularly the difference in prognosis and treatment of pyelonephrosis, can be answered. Similarly in hematuria, where a growth is suspected, an exploratory operation would be warranted.

In a review of 1550 major surgical operations on the kidney and ureter, V C Hunt (Northwest Med 27 213 (May) 1928) discusses renal anomalies and states that those of blood supply, position and development are of surgical importance. Anomalies of vessels to an anatomically normal kidney and to horseshoe and ectopic kidneys may give rise to obstruction at the uretero-pelvic junction, resulting in intermittent *hydronephrosis*. This may be readily demonstrated at opera-

tion When the hydronephrosis is at all marked, simple division of the anomalous vessel usually proves inadequate and plastic operations have not been successful Twenty-three operations were for *horseshoe kidney*, in 12 of which, the indication was lithiasis The approach is most readily made through the usual posterior incision, but the pelvis must be opened anteriorly. In 2 cases of complete *reduplication of the pelvis*, *heminephrectomy* was performed, the surgical disease involving only 1 renal unit

#### CONGENITAL ANOMALIES —

A case of *lymphogranuloma* of the kidney is reported by A von Albertini (Schweiz med Wchnschr (July 28) 1928) A case of malignant *chorion-epithelioma* is reported by Ichiro Arata (Japanische Ztschr f Urol (Jan) 1929)

H L Kretschmer (Surg Gynec Obst 99 818 (Dec) 1929) in a review of the literature, reports a case of *supernumerary kidney* in which *nephrectomy* was done with recovery Six cases of *renal aplasia* are reported by D W Mackenzie and A B Hawthorne (Surg Gynec Obst 46 42 (Jan) 1928, Canad M. A J 18 502 (May) 1928) The symptoms in 3 cases were on the side of the remaining kidney and in the other 3 cases there was definite pain on the side of the aplastic kidney J E Davis (J Urol 20 155 (Aug) 1928), following a review of the essential features in the functional and structural development of the urinary excretory processes from the lowest to the highest forms of life, discusses the comparative anatomy of the kidneys of animals having matured pronephric and mesonephric development and

occurrence and etiology of renal malformations in animals and man He reports a study of 20 cases of human congenital polycystic kidney in subjects ranging from a fetus of 5 months to a man 65 years of age

*Crossed renal dystocia* is discussed by J G Gottlieb (J d'urol 24 139 (Aug) 1927) He reviews 106 cases reported in the literature to which he adds his own case If the dystocia does not cause symptoms, it does not require treatment

A case of *horseshoe kidney* with a calculus, in the right pelvis, weighing 4 ounces and 80 grains, plus a carcinomatous infiltration of the kidney substance, is reported by R J Willan (Brit J Surg 16 317 (Oct) 1928) The patient died the day after operation of sudden cardiac failure Another case, in which diagnosis was made by simple x-ray examination without pyelography, is reported by A Kniper (Radiol med 15 684 (July) 1928) In these cases W Heckenbach (Ztschr f urol Chir 24 361 (Apr 14) 1928) suggests *heminephrectomy* or *removal of the diseased portion*, preserving the remaining kidney substance

The case of a congenital *solitary kidney* in a girl 19 years old is reported by R A Hennessey (J Urol 21 193 (Feb) 1929) At autopsy the kidney was not in the renal fossa, but fixed in the pelvis by dense perirenal adhesions in the hollow of the sacrum The author reports 373 cases from the literature The anomaly occurs in about 1 of 1000 persons The presence of 2 ureters does not prove the presence of 2 kidneys The incidence of associated urinary anomalies is about 33 per cent However, A R. Thompson (Guys Hosp Rep 79 207

(Apr) 1929), in a review of 12,888 autopsies, found the condition only once in 400 autopsies

An *ectopic kidney*, lying in the hollow of the sacrum with 3 ureters uniting to form a sac, is reported by W S Perrin (Proc Roy Soc Med London 20 1806, 1927) The right kidney was in the normal position The same author also reports a case of a normally placed right kidney possessing 2 pelves and 2 ureters opening separately into the bladder, the center part of the kidney between the pelves being occupied by a Grawitz tumor

In a report based on 50,198 autopsies performed at the Obouchov Hospital during the years 1890 to 1927, N N Sokolov (Vestnik Khir 12 166, 13 260, 141, 1928) gives in detail the percentages of the various congenital malformations encountered

**CYSTS**—Solitary cysts of the kidney are discussed from a review of the literature and a study of 4 cases by W J Carson (Ann Surg 87 250 (Feb) 1928) The author believes that polycystic kidney, solitary serous cyst and solitary hemorrhagic cysts of the kidney are all the result of congenital malformations of the kidney, and that the solitary hemorrhagic cyst is formed in the same way as the solitary serous cyst A case of hemorrhagic cyst in a man is reported by J Cibert (J d'urol 25 546 (June) 1928) The symptoms were not unlike that of hydronephrosis At operation in which **nephrectomy** was done, 4 liters (quarts) of black and sanguineous liquid were evacuated

A solitary *serous cyst* of the kidney is reported by B Lewis and G Carroll (Urol and Cutan Rev 33 145 (Mar) 1929), who advise nephrec-

tomy only when the function prior to operation is *nil*, or when other cysts of the kidney are present, which may give rise to a return of the symptoms. The cysts may be shelled out, without hemorrhage, since there is a distinct line of cleavage Removal of the cyst is always indicated because they tend to grow large and, by compression, gradually reduce the size and function of the kidney This same opinion is expressed by G Giordano (Policlinico (sez chir) 35 318 (June) 1928) who reports a case with recovery

**POLYCYSTIC KIDNEYS**—*Etiology*—That the etiologic factors in *congenital* polycystic kidneys are inherited protoplasmic insufficiency, specifically expressed in the differentiation of the most complicated tubular organic structures (kidney and liver), is the opinion of R E Cumming (J Urol 19 149 (Feb) 1928) This insufficiency is manifested by delayed differentiation of cellular unit structures He cites the occurrence of this condition in a maternal grandmother, uncle and aunt, the mother and son In another case the mother and the maternal grandmother were known to have kidney disease The mother had several operations for kidney tumors, including nephrectomy, after which she lived a year A brother died at the age of 43 of bilateral renal tumors, and a sister, living, at the age of 38, has kidney trouble associated with hypertension The patient himself has bilateral polycystic kidneys

The report of 4 generations in succession of a single family with polycystic kidneys, affecting 9 out of a total of 27 individuals, is given by C J Fuller (Quart J Med 22 567 (July) 1929)

**Pathology**—The clinical course of patients affected with bilateral polycystic disease is essentially the result of the same obliterative process in the arterioles and small arteries of the kidney according to S A Ritter and G Baehr (J Urol 21 583 (May) 1929)

**Diagnosis**—That the diagnosis of the condition is always difficult is expressed by S Litzner (Med Klin 25. 381 (Mar 8) 1929) However, the author believes that when pyelography reveals changes in the form of the pelvis of the kidney, diagnosis of cystic kidney is indicated Cases reported in the literature, as well as his own case, prove that such changes are typical A case of bilateral polycystic disease which gave symptoms during life that were not unlike that of Addison's anemia, is reported by G C Campbell (Brit M J 2 716 (Oct 19) 1929) Likewise, 2 cases of bilateral polycystic disease are reported by G M Piersol (Ann Int Med 1 812 (Apr) 1928) In both cases diagnosis was difficult, in 1 case it was made on the operating table and in the other at necropsy

A case of unilateral polycystic kidney, diagnosed as renal growth preoperatively, is reported by H T Mursell (Brit J Urol 1 64 (Mar) 1929) Likewise, M Jacoby (Ztschr f Urol 23 1, 1929) reports a case of unilateral polycystic kidney in a woman aged 51 The other (right) kidney was normal

**Treatment**—A case of unilateral polycystic kidney treated by nephrectomy is reported by B A Thomas (Ann Surg 89 946, 1929) The author believes that, because of the everlasting question of bilaterality of the condition, the removal of the poly-

cystic kidney should be undertaken with great hesitancy

**ECHINOCOCCUS CYST**—A fatal case of echinococcus cyst of the kidney treated by nephrectomy is reported by M Meltzer (J. A. M. A. 92 1925 (June 8) 1929). In a questionnaire the author found only 22 cases, including his own, reported in this country Of 1460 cases of hydatid disease admitted to the Royal Prince Alfred Hospital in the past 42 years, only 28 cases affecting the kidney are reported (Surg Gynec. Obst (May) 1928) G Oulie (Bull et mém Soc nat de Chir 54 718 (May 26) 1928) reports 4 cases treated by puncture and injection of formalin. He thinks this is the best method of treatment because it preserves the kidney

**HYDRONEPHROSIS.—ETIOLOGY**—The presence of an aberrant vessel to the lower pole of the kidney, causing kinking of the ureter either primarily or following the sagging of a movable kidney, is reported by C P Mathé (J Urol 19 211, 1928), who discusses the symptoms and diagnosis in 11 cases of hydronephrosis However, Marion (J d'urol med et chir 26 238 (Mar) 1928), who accepts this as an etiologic factor, is of the opinion that in the great majority of cases a lowering of the position of the kidney is an important factor In a report of 12 cases B Fey (Bull et mem Soc nat de chir 54 383 (Mar 17) 1928), states that the condition is functional, rather than mechanical, and that the various pictures of the pelvis and ureters obtained in formalin hardened specimens, or seen by pyelography, represent but a transitory state of the ureters and renal pelvis

A case of unusually large traumatic hydronephrosis is cited by A von Adler-Racz (*Ztschr f urol Chir* 24 578 (May 31) 1928). The right kidney was removed 6 months after injury and contained 9 liters (quarts) of fluid. The patient made a complete recovery. Two cases in which the pelvic dilatation was probably due to the oblique course of the upper end of the ureter through the pelvic wall, probably congenital, are reported by J Hellstrom (*Acta chir* 62 167, 1927). A case of gonococcal hydronephrosis is reported by K E Birkhaug and A L Parlow (*J Urol* 10 83 (July) 1928), who conclude that the infection was brought about by means of a generalized gonococcal bacteremia, rather than by direct or indirect ascending routes leading from the lower genito-urinary tract to the kidney pelvis.

**DIAGNOSIS**—A lateral x-ray was of aid in the diagnosis of hydronephrosis caused by a band containing an aberrant renal vessel found by A F Lindblom (*Acta Radiol* 9 611, 1928). The renal pelvis was rendered opaque by a contrast medium. He therefore emphasizes the importance of always making a lateral roentgenogram when the diagnosis is doubtful.

**TREATMENT**—In a series of 13 cases of hydronephrosis due to renal stasis, W C Quinby (*J A M A* 89 841 (Sept 10) 1927) finds that the only procedure which gives permanent results is the one in which the ureter is transplanted into the most dependent part of the pelvis.

Twelve cases, 9 of which resulted in cure after operation, are reported by B Fey (*Arch urol de la clin. de Necker* 6.193, 1928). In 1 case no

lesion was found, in another case treatment failed, while in the other with rotation of the kidney only partial cure resulted. The author states that because of the technical difficulties and the uncertainty of results he has never employed any of the plastic operations on the pelvis or ureter. However, E Papin (*Bull. et mém Soc nat. de chir* 54 500 (Apr 7) 1928) reports a series of conservative operations in congenital hydronephrosis. This author attempts to save as much renal functioning tissue as possible, determining the extent of the condition by pyelography. He completes every operation with **nephropexy**, which he considers an important step in the procedure.

Whereas, normally, the ureter issues from the lowest part of the pelvis of the kidney, in hydronephrosis it issues from a point higher up on the pelvis. The object of all operations for hydronephrosis should be to eliminate the resulting recess in the pelvis. To accomplish this B von Mezo (*Ztschr f urol Chir* 26 488 (Apr 6) 1929), fixes the kidney in transverse position so that the ureter drains the entire pelvis. With this operation, kidneys, which otherwise would have to be removed, can be left in place.

That operation should not be resorted to until a careful and systematic study is done by ureteropyelography, is the opinion of M Chevasau (*Bull et mém Soc nat de chir* 54 900 (June 30) 1928), who calls attention to the fact that variation in the caliber of the ureters in different persons may give rise to errors of interpretation.

Ten operative procedures upon 9 patients at the Mayo clinic, including 1 case of bilateral resection of hydro-

nephrotic renal pelves, are reported by W Walters and W F Braasch (J A M A 93 1710 (Nov 30) 1929) Results of 9 of the 10 operations were good In 4 cases, 5 of the hydro-nephrotic renal pelves were resected Four of these resections were successful Secondary nephrectomy was necessary in the other case

**INFECTIONS** — *Perinephritic abscess* is discussed by H C Haben (Minnesota Med 11 292 (May) 1928), who analyzes 44 cases of the extra-renal type. The ages of the patients ranged from 14 to 63 years and the disease was most common between the ages of 20 and 30 All cases showed a significant loss of weight The urine was normal except for a trace of albumen and occasional pus cells and in 1 specimen, sugar The average hemoglobin in the group was 53 per cent and the leukocyte count varied from 12,800 to 34,400 Pain over the site of infection was present in all cases In 3 cases there was no tenderness over the area of the abscess on palpation In 69 per cent a tumor was palpable The abscess was found on the right side in 31 cases and on the left in 13 Three of the 44 cases died, a mortality of 6.8 per cent

A case of *perinephritic abscess* which ruptured directly into the lung just before operation is reported by J H Sanford and H A Rusk (J Missouri M A 25 374 (Aug) 1928) This occurred without empyema Immediate and extensive drainage of the abscess was done The diaphragmatic sinus was completely healed in 3 weeks and the perinephritic space entirely closed in 6 weeks

S A Brofeldt (Acta Soc Med Fenn Duodecim 8 10, 1927) reports

a series of 47 cases of *perinephritic abscesses* from the University Surgical Clinic of Helsingfors, 30 of the patients being males The author discusses primary and secondary perinephritis Surgery gives best results when performed early; however, operation is indicated only when the true symptoms of perinephritic abscess are noted A cure is sometimes obtained by conservative treatment, but operation gives better results. The author uses the usual oblique lumbar incision The surface of the kidney is palpated and fluctuating areas are broken into with the finger In all the 31 cases which were operated upon, only 1 incision was made at first and if nephrectomy was deemed necessary, it was done at a second stage The only exceptions were cases of pyonephroses in which the basic condition was treated according to indications. The *prognosis* of perinephritis due to pyonephrosis is extraordinarily poor, but in the other types of cases it is relatively favorable That an x-ray in an acute case of perinephritic abscess reveals a curvature of the spine with its concavity toward the affected side, associated with clouding and almost complete disappearance of the angle formed by the shadows of the inner borders and lower pole of the kidney and the lateral margin of the psoas muscle is revealed by P J Lipsett (J A M A 90 137 (Apr 28) 1928) At the same writing Beer also states that the curvature of the spine is away from the involved side and that obscuration is present of the outer margin of the psoas muscle

The report of 2 cases of retroperitoneal lumbar (*paranephritic*) abscess is given by A Brown (J. A. M. A.

90 666 (Mar 3) 1928) This author states that there is no communication between the perinephritic and paranephritic tissues and that the paranephritic abscess usually occurs following traumatism. The author further believes that a true perinephritic abscess involves the true fatty capsule of the kidney itself, as contrasted to the fatty tissue which is distinctly separate from the fatty capsule.

Two cases of *carbuncle* of the kidney, treated by **incision** and **drainage**, with recovery, are reported by J. A. Lazarus (J. Urol. 21 353 (Mar) 1929). A review of the literature, however, reveals that treatment of choice is **nephrectomy**. A detailed study, with its results, of 31 cases of carbuncle of the kidney is given by T. D. Moore (South M. J. 22 338 (Apr) 1929). The report of a case in a woman who had had a carbuncle of the neck 1 month previous is given by Thompson (Lancet (Oct) 1927). The author concludes that the diagnosis can only be made at the operation.

**NEPHROLITHIASIS — ETIOLOGY** — The colloidal theory is advanced as an etiologic factor in the formation by Daniel P. Ray (Atlantic M. J. 31 934 (Sept) 1928). The author states that the absence of colloids in the urine is brought about by certain pathological conditions within the kidney, due either to local disease or to external influences reacting upon the kidney.

Two cases of nephrolithiasis with many recurrences and reoperations, are reported by W. W. Babcock (S. Clin. North America 8 791 (Aug) 1928). The author mentions 3 factors which favor the reformation: (1) A blood clot remaining in the kidney,

upon which a calcareous deposit occurs, (2) dilatation of the pelvis or calices, and (3) particles of stone left at operation. He states that stones are removed through the pelvis of the kidney. P. Cifuentes (J. d'urolog. 26 289 (Oct) 1928) thinks that the 2 principal factors involved in the pathogenesis of post-operative recurrent renal calculi are infection and retention of urine, the latter being due to ureteral strictures or post-operative displacements of the kidney. The size and form of the calculi are secondary factors. As a *prophylactic* measure he recommends **nephrotomy** with **drainage** of the kidney and **post-operative** irrigation of the renal pelvis.

A case of vesico-renal lithiasis in a 3-year-old child, whose mother had been operated on at the age of 3 for bladder stone and 2 of whose sisters had likewise had bladder stones, is reported by H. L. Rocher and Blanc (Gaz. H. d. Sc. med. le Bordeaux (Mar 25) 1928). Another case of infantile lithiasis is reported by R. Stohr (Monatschr. f. Kinderh. (Aug) 1928). Both ureters were occluded in the pelvis at the entrance to the ureter by a stone the size of a bean. The case terminated fatally because of anuria. The child, 16 months old, had been fed almost exclusively on a brown flour mixture prepared from flour, water and a butter substitute. The author believes that the unsuitable diet was responsible for the stone formation, either from lack of an animal product or from vitamin deficiency.

**DIAGNOSIS** — Petrographic sections of urinary calculi and the determination of the nature of their crystalline layers by means of crystallography, is



advocated by Pillet (J d'urol 25 48, 1928) By this means the different layers may be examined as in a histologic section, and recognized by the special forms of their crystals

That not uncommonly a diagnosis of Bright's disease is made in cases of renal or ureteral stone, is the opinion of A R Thompson (Guy's Hosp Rep 79 173 (Apr) 1929), who bases his report on a large number of autopsies performed at Guy's Hospital, London Hospital, and Victoria Hospital for Children

In a plea for conservative surgery in renal lithiasis, B S Barringer (Am J Surg 6 777 (June) 1929) cites several cases in which estimate of kidney function may be very faulty when a kidney is temporarily and partly blocked by a ureteral stone Had the exact data of kidney function been followed, it might have been removed, however, after conservative surgery, it was found to function normally

In a report of 5 cases, Ezickson (Urol and Cutan Rev 33 163 (Mar) 1929) shows the difficulty in making a definite diagnosis in certain types of cases He, therefore, feels that every patient with symptoms referable to the genito-urinary tract, and also those presenting vague abdominal symptoms, should be carefully studied for urinary lithiasis

*Pneumo-pyelography* is mentioned as the method of choice in the diagnosis of nephrolithiasis by Neuwirt

That the x-rays in renal and ureteral calculi do not always show the stones is expressed by R Chwalla (Ztschr f urol Chir 26:157 (Mar. 4) 1929) In a series of 234 cases 10 per cent of renal and 15.4 per cent of ureteral calculi were not apparent.

The author thinks that the extent and severity of the kidney lesion cannot be estimated by the indigo carmine test, since he has found that even when the changes in the organ are marked, the removal of the calculi is frequently followed by complete recovery J Troltzsch (Ztschr f urol. Chir (May 31) 1928) reports a case of albuminous stones, 10 in number, found in a kidney in which the tissue had been completely destroyed Few cases of this sort are on record. The patient had passed many stones and much gravel by the urethra over a period of 24 years Hematuria was constantly present during this time. Such hematurias are regarded as the cause of albuminous stones since hematin can be demonstrated chemically in the concretions

Stevens (California West Med 28:203 (Feb) 1928) reports 4 cases of unusual urinary calculi One case gave no symptoms and the kidney gave better function than the opposite one which was not pathologic The second case showed giant calculi present simultaneously in both ureters The third case was found to be a false prostatic calculus weighing 50 grams In the fourth case there were numerous urethral stones with a wide distribution The author emphasizes the importance of stereoscopic roentgenograms in making a diagnosis

**PROGNOSIS**—F Legueu, B Fey and Coidan (Arch urol de la clin de Necker 6 175, 1928) report 17 cases reexamined whom they had operated upon for the condition Of the authors' 9 patients who were free from recurrence and had clear urine, only 1 showed any degree of retention in the renal pelvis The 3 whose

urine remained infected showed retarded evacuation of the renal pelvis. Therefore, the ultimate cause of recurrent calculi appears to be retention which acts by maintaining infection.

**TREATMENT.**—W. F. Braasch (Wisconsin M J 29 199 (May) 1928) reports 133 patients operated upon for renal stone at the Mayo Clinic during 1926. In 45 cases the kidney was so badly injured that it was necessary to remove it. Because patients with calculus in the upper urinary tract are subject to some form of urinary stasis, and the most frequent cause of the stasis is ureteral stricture, G. L. Hunner (J Urol 20 61 (July) 1928) thinks that the chief concern is the establishment of adequate renal drainage. Dietary treatment for small calculi and for post-operative cases of large calculi is recommended by G. von Pannewitz (Deutsche med Wochenschr 55 1078 (June 28) 1929). It is necessary to know the chemical composition of the stones before effective diets can be prescribed.

In discussing renal lithiasis, in a review of 1550 major surgical operations on the kidney and ureters, V. C. Hunt (Northwest Med 27 213 (May) 1928) states that bilateral lithiasis may not necessitate bilateral operation. In the absence of symptoms a small stone on one side may pass spontaneously. Even when indications are clear for a bilateral operation, it is inadvisable to do both sides simultaneously. The kidney causing acute symptoms should receive the first attention. In the absence of symptoms and with marked difference in the function of the 2 kidneys, the kidney with the better function should be operated first.

**Nephrectomy** was necessary in 33 per cent of the cases of renal lithiasis. It is indicated for stone in the presence of pyonephrosis or marked infection and for cases of large branched stones in which conservative operation has failed. The operative mortality was 21 per cent. The conservative operations included 440 pelviolithotomies and nephrolithotomies. It was possible to remove stones in 84 per cent of the cases by pelviolithotomies, even when they were multiple and situated in the major calices. Reformation may follow failure to remove the cause of the primary formation, such as focal infection, etc.

**TUBERCULOSIS — DIAGNOSIS**—The finding of the *Koch bacillus* in the smear (when the third test-tube was used) is the best evidence of renal involvement in the opinion of Edwin Beer (J A M A 92 1912 (June 8) 1929) in a detailed discussion of the diagnosis and treatment. **Nephrectomy with removal of the upper ureter** is the operation of choice.

In a detailed discussion on the operative mortality J. Thomson-Walker (British M J 2 625 (Oct 8) 1927) gives 7 points in the diagnosis: (1) The spontaneous development of cystitis with an insidious onset in a young adult in association with discomfort, pain, enlargement and tenderness of the kidney, (2) aseptic pyuria and albuminuria (constant signs), (3) the presence of tubercle bacilli in the urine, (4) the complement fixation reaction, (5) positive cystoscopic findings, (6) the findings of catheterization of both ureters and examination of the urine with regard to tubercle bacilli, other bacteria and the functional power of the kidney, (7) the demonstration by the x-ray

examination of caseous area in the tuberculous kidney and thickening of the ureter, and the demonstration by pyelography of changes in the renal pelvis and calices

Obliteration of the pelvic curve of the ureter in a large percentage of cases of unilateral renal tuberculosis was revealed by a shadowgraph catheter on the affected side, according to R L Dourmashkin (J Urol. 21 455 (Apr) 1929) It may be produced, however, in conditions other than tuberculosis The frequency with which it is observed in tuberculosis renders it of value in doubtful cases

That pyelography is often negative or misleading in tuberculous kidneys, in addition to the great danger of dissemination by the procedure, is the opinion of Walter M Kearns (Radiology 9 109 (Aug) 1927)

Albuminuria and pyuria, without casts, are important diagnostic findings, according to R Fronstein (J d'urol 25 434 (May) 1928), who considers early diagnosis is of great importance, owing to the fact that at the present time **nephrectomy** is the only effective method of treating the disease

G Andrén (Acta radiol 9 289, 1928) states that the characteristic feature of the pyelographic picture of relatively early renal tuberculosis is the presence of signs of infiltration of a calix wall and of narrow fistulous tracts extending from this area He reports 2 cases in which the diagnosis was made by pyelography after other methods of examination had failed to definitely indicate the nature of the condition

The indigo carmine test as a method of diagnosing early renal tuberculosis is recommended by M Hubleur

(J d'urol 24 252, 1927) The elimination of the dye is generally retarded for from 2 to 5 minutes Under normal conditions the dye, when injected intramuscularly, appears in the urine in from 6 to 10 minutes

F de Rom (J d'urol 26 521 (Dec) 1928) in a number of experiments upon rabbits tried the phenolsulphonphthalein test upon a single kidney In general, the extent of the lesions correspond very closely to the reduction of the excretory power of the kidney In 1 instance, however, the excretion was 80 per cent 9 days before the rabbit died and 75 per cent just before its death

A new diagnostic sign is mentioned by L Lurz (Ztschr f Urol 23 673 (Sept) 1929) The exertion of deep pressure on the side of the abdomen in cases of tuberculosis of the kidney causes the ureteral orifice in the bladder to be drawn upward He considers this phenomenon an absolutely specific and certain sign In 16 cases of ureteral insufficiency with severe cholecystitis the author was able to exclude tuberculosis by the absence of this sign

**TREATMENT**—In a report of 660 nephrectomies for tuberculosis H Wildbolz (J Urol 21 145 (Feb) 1929) states that 60 per cent of the patients were well 2 to 3 years after operation Of 270 who were operated on more than 10 years ago, 40 per cent were well More than one-half of the deaths were due to tuberculosis in the remaining kidney and lungs or to miliary tuberculosis Of more than 1000 cases of caseous renal tuberculosis studied the condition was found to be bilateral in only 12 per cent That **nephrectomy** seems to be the proper procedure in the

treatment of renal tuberculosis is expressed by P A Rohrer (J Urol 22 247 (Aug) 1929) who reports 63 per cent of the patients (in a series of 25, of which 19 were operated) have been cured by the nephrectomy.

In discussing renal tuberculosis, V C Hunt (Northwest Med 27 213 (May) 1928) states that it is usually cured only by **nephrectomy**. The prognosis depends on the extent of the urinary tract involvement, the presence or absence of tuberculous cystitis, and the activity of tuberculous lesions elsewhere. Eighty per cent of these cases have associated tuberculous lesions elsewhere. Of the nephrectomies 28 per cent, or 258 cases, were done for these lesions. The mortality was 23 per cent. A temporary sinus following nephrectomy for tuberculosis is usually due to incomplete removal of the diseased tissue, persisting infection of the ureter, or the establishment of drainage.

K Hegehus (Ztschr f Urol 33 847, 1929) reports the case of a youth aged 19 in whom **decapsulation** of a remaining kidney for complete anuria 3 months after **resection** of the other kidney for tuberculosis, saved the life of the patient.

That the persistence of sinuses, following nephrectomy in so many cases, is due, not to the continuation of an existing infection, but to the development of a new tuberculous process in the traumatized tissues of a patient with lowered resistance, is the opinion of B G Scholefield (J Urol 20 345 (Sept) 1928). Improvement in the results, therefore, is more likely to come from a study of the patient's general health before and after operation than from any elaboration of operative technic.

Troublesome sequelæ following nephrectomy are enumerated as follows by F Cathelin (Rev gén de clin et de therap 42 321 (May 19) 1928): (1) Purulent and uropurulent fistulæ, (2) opening up of the operative wound, (3) painful phenomena in the remaining kidney due to increased work, (4) painful phenomena in the stump of the ureter, (5) painful phenomena in the bladder due to continuation of cystitis.

**NON-SURGICAL RENAL TUBERCULOSIS.**—Robert Gutierrez (Am J Surg 5 99 (Aug) 1928) calls attention to the extreme and progressive types of this condition, and to the fact that there are certain instances of this disease in which surgery, as a therapeutic measure, should not be employed. In a selected group of cases, combined urological and medical treatment yields the most satisfactory results. The author presents 3 cases in detail. One illustrates the incidence of an excretory renal tuberculous bacilluria without demonstrable pathological lesion in the kidney. The second illustrates early bilateral renal tuberculosis when surgery must be applied as the best and most reasonable treatment for arresting or curing the disease. In this case there was good kidney function on one side and diminished function on the other, so that the more seriously affected kidney was removed. The third case was one of advanced bilateral renal tuberculosis, in which both sides were equally involved, with greatly diminished function, showing the inadvisability of surgical treatment. To arrive at a sound diagnosis and prognosis the author bases his data on the triad of

clinical findings, kidney functional tests, and pyelographic studies

**TREATMENT**—That inoperable and post-operative cases of tuberculosis of the urinary tract should have the benefit of medical treatment is the opinion of W R Delzell (*Amer J Surg* 5 209 (Sept) 1928) Medical care of these cases is an adjunct not a substitute for surgical care The use of Vaudremer's vaccine in the treatment of inoperable renal tuberculosis reported by M Larget and E Moreau (*J d'urol* 26.556, 1928) in 4 cases resulted in marked improvement in the general health The pyuria was largely relieved, the tubercle bacilli disappeared from the urine, and the functional capacity of the kidney, as determined by 'phthalein test and Ambard's constant, was increased The authors believe that the vaccine treatment in no way modifies the indications for operative treatment, but that it offers considerable promise in inoperable cases

The x-rays give good results in post-operative tuberculous sinuses and in tuberculous infections of the kidney, according to A Soiland, W E Costolow and O N Meland (*California and West Med* 30 93 (Feb) 1929) **Heliotherapy** is recommended as a subsidiary to **nephrectomy** by Rollier (*Brit J Tuberc* 22 9 (Jan) 1928)

**TUMORS**—*Symptoms*—In a discussion of kidney tumors, W S Pugh (*M J and Rec* 128 169 (Aug 15) 1928) divides the symptoms into early and late Urinary symptoms such as urgency, frequency and dysuria, are usually the forerunners of the cardinal (late) symptoms, which are hematuria, pain and tumor formation A pyelogram usually confirms the diag-

nosis If there is a doubt an exploratory nephrectomy is justifiable However, from a series of 45 malignant and 3 non-malignant cases, A Schmidt (*Beit z klin Chir* 145 48 (Nov 23) 1928) stresses indefiniteness of the symptoms as being of value, in that it should direct attention to the kidney

*Diagnosis*—The employment of pneumo-kidney, in combination with pyelography, and the use of pyeloscopy and nephroscopy as auxiliary methods, is advocated by J Gottlieb (*J d'urol* 24 224 (Sept) 1927) who reports a series of 8 cases, all of which were correctly diagnosed, despite the fact that early and cardinal symptoms were not typical of kidney tumor

Certain deformities of the calices and renal pelvis, as shown by pyelographic examination, indicate *carcinoma* of the kidney G Motz (*Arch urol de la clin de Necker* 6 1, 1927) reports a series of 18 cases of *cancer*, 16 of which showed characteristic deformities

**BENIGN**—Two cases of *lipoma*, one being perirenal and the other intrarenal, are reported by V C Hunt and H E Simon, of the Mayo Clinic (*Am J Surg* 4 390 (Apr) 1928) In general, lipomas occur in situations in which adipose tissue is normally present This is not true, however, of the intrarenal lipoma, which is generally believed to arise from multiplication and fatty metamorphosis of the perivascular and intertubular connective tissue cells

A case of *cystic adenoma* of a papilla of the kidney reported by J Salleras (*Semana med* 2 414 (Aug 16) 1928) was shown by microscopic examination of the kidney Another case of adenoma of the kidney is reported by H L Kretchmer and C Doering (*Surg*

Gynec Obst 48 629 (May) 1929) The patient was well 8 years after discovery of the tumor and 4 years after the operation

A *teratoma* of the kidney, reported by S MacDonald (Proc Roy Soc Med 21 1893, 1928), occurred in a patient 50 years old. Four months after nephrectomy the patient died. At autopsy there was found a large recurrence occupying the bed of the kidney.

A case of *hygroma* was found at necropsy by G S Epstein (J d'urol 26 141 (Aug) 1928). The patient, a woman, aged 45, died of carcinoma of the uterus. The left kidney was found enclosed in a cyst filled with transparent fluid, in much the same manner that the testis is found in the cavity of a hydrocele.

The first case of *leiomyoma* of the kidney found during life, as contrasted to the 2 reported in the literature found accidentally at necropsy, is reported by H G Bugbee (J urol 22 363 (Oct) 1929). The patient was a woman, aged 30, who had noticed a lump in the right side of the abdomen for 12 years. Pyelogram showed no distortion or dilatation of the kidney. **Nephrectomy** was followed by an uneventful recovery.

A case of *benign papilloma* of the renal pelvis is described by D Lamont (Glasgow M J 111 216 (Apr) 1929), who believes that certain persons have a papilloma forming diathesis, as witnessed by the fact that these patients usually also show papilloma of the skin.

*Benign mixed tumors* of the kidney described by Watson (Canad M A J 18 511 (May) 1928), were of the fibrolipomyxomatous group with the constant finding of fat, muscle and

fibrous tissue cells in all parts of the tumor mass. The case of a *perirenal tumor* which was found to be a *fibro-angioma* is reported by A H Harris (J urol 21 181 (Feb) 1929). The majority of perirenal tumors are *sarcomata*.

**MALIGNANT**—From a review of the literature, A Hyman (Am J. Surg 5 120 (Aug) 1928), reports 99 cases of renal neoplasms, 65 per cent of which were *hypernephroma*. Sixty three of the patients were between 40 and 50 years of age and 72 of them were males. Operation is contraindicated where the tumor is large and immovable, adherent to the spine and diaphragm, or extends into the vena cava. X-ray treatments before and after operation seem of no avail. Half of the patients who survive the operation by 3 years succumb before 5 years have elapsed.

In a discussion of 1550 major surgical operations on the kidney and ureters, V C Hunt (Northwest Med 27 213 (May) 1928) states that the most common malignant lesion of the kidney was *hypernephroma*. If it is mobile, operation should be considered. The anterior transperitoneal route facilitates removal of large tumors. Operation was done in 127 cases with 10 deaths.

A case of malignant *papilloma* of the kidney with metastasis to the liver and lungs, resulting in death 6 weeks after operation is reported by O W Roberts (Lancet 2 67 (July 14) 1928). The patient was a boy 11 years old.

Papillary *epithelioma* of the renal pelvis is discussed by V C Hunt (J Urol 18 228 (Sept) 1927) who reports 23 cases in a series of 318 malignant tumors removed by neph-

rectomy at the Mayo Clinic Papillary epithelioma of the renal pelvis may, according to the same author (Northwest Med 27 213 (May) 1928), be of the flat squamous cell or the papillary type The latter, which is not so malignant microscopically and does not progress by direct invasion of the tissue nor metastasize remotely, progresses by extension along the mucous membrane and may involve the bladder, as it did in 66 per cent of the cases of a recent series studied The preferred treatment is a **combined operation** removing kidney, ureter and the surrounding bladder wall This operation, recently performed in 6 cases, has no greater risk than nephrectomy alone and offers added assurance against recurrence A case of epidermoid epithelioma of the kidney with calculous uropyonephrosis in a man aged 53, who made an uneventful recovery following **nephrectomy** is reported by C R. Fumagalli (Arch ital di urol 4 285 (Apr) 1928)

That a preoperative diagnosis of sarcoma of the kidney as differentiated from other types of kidney tumor is practically impossible is the opinion of H L Kretchmer and H S Randolph (Ann Surg 88 1033 (Dec) 1928) who report a case of spindle celled *sarcoma* of the kidney in an adult aged 55 The patient died several months after operation as a result of extensive local recurrence

A case of *sarcoma* of the left kidney in a child 14 months old is reported by Arfio Puglip (Lettura medica (May 15) 1928) The author found in 704 cases of sarcoma (Jemme) 70 per cent concerned children up to 3 years of age.

In a case of spindle cell *sarcoma*

which was removed 6½ years ago, the patient, a male, aged 29 when operated upon, is reported as living and well, without recurrence, by C L Deming (N England J Med 199 273 (Aug 9) 1928)

The case of a pure *hypernephroma* in one portion of the kidney and a *sarcoma*, entirely independent of the hypernephroma, in another portion, is reported by J Ujhelyi (Ztschr f urol Chir 23 85 (1927) The patient died 3 hours after operation The author cites a similar case reported by Lubarsch

A case of embryonal *adenosarcoma* of the kidney in a patient aged 48, is reported by C F Kilbane and C W Lester (Surg Gynec Obst 49 710 (Nov) 1929) This is the sixteenth case on record **Nephrectomy** was followed by death 24 weeks after the onset of symptoms (For consideration of KIDNEY DISEASE, see NEPHRITIS)

**OPERATIONS** — Of 1550 major surgical operations on the kidney and ureter reviewed by V C Hunt (Northwest Med 27 213 (May) 1928), 87 per cent were performed for renal disease and 67 per cent of the latter were nephrectomies A careful urologic examination should be made in cases of atypical abdominal pain with x-ray shadows in the region of the urinary tract and the presence of blood and pus cells in the urine Renal function serves as a guide to the time and method of treatment and to prognosis

From experiments on rabbits, M del Rio (Arch ital di chir 23 91 (Jan) 1929) concludes that *renal hemostasis* by means of a **plastic graft** of muscle or fat, is prompt, complete and lasting The presence within the

renal parenchyma of heterogeneous tissue such as muscle and fat generates an intense connective tissue reaction, usually associated with an active calcareous infiltration, about the remnants of the graft that served to hold it in place. It is not deemed advisable to substitute this method for the usual means of suturing, however.

**ANESTHESIA**—The use of local combined with **paravertebral anesthesia** is suggested by R. B. Henline (J Urol 21 27 (Jan) 1929) as the anesthesia of choice in renal surgery. Preliminary injection of 3 ampoules, each containing  $\frac{1}{8}$  grain (0.008 Gm.) **morphine sulphate** in 2 c.c. (32 minims) 50 per cent **magnesium sulphate** are given at half-hour intervals previous to operation. A 1 per cent **procaine solution** without epinephrine is injected both below and above the transverse processes of the vertebrae from the eighth dorsal to the second lumbar inclusive, 5 c.c. ( $1\frac{1}{4}$  drams) being injected above and below each, except for the 2 lumbar nerves, where 10 c.c. ( $2\frac{1}{2}$  drams) are used. This is supplemented by a **splanchnic analgesia** and infiltration along the line of incision. The advantages to the patient are many. Fluids may be taken before, immediately after, and even during the operation, the anesthesia persists for an average of  $3\frac{1}{4}$  hours after operation, less post-operative opiates are required and some patients are comfortable without any narcotic, pulmonary complications are diminished, abdominal distention is less frequent and severe, nausea and vomiting are rare, the mortality rate is lessened, and convalescence begins when the patient leaves the operating table. Relaxation of the tissues is complete.

Operation may be performed on any patient regardless of the co-existing complications present.

In a series of 61 cases over a period of 3 years, A. W. Wischnewsky (Zentralbl f Chir 55 524 (Mar 3) 1928) reports good results with the use of  $\frac{1}{4}$  per cent **novocaine** containing 4 drops of **adrenalin** to every 100 c.c. ( $3\frac{1}{3}$  ounces) infiltrated. The author uses 300 to 600 c.c. (10 to 20 ounces) of solution. He injects and then cuts immediately, allowing the solution to escape as he cuts.

**CONSERVATIVE SURGERY**—That the kidney can always be removed, but never be replaced is the thought of W. E. Lower and G. W. Belcher (Am J Surg 5 191 (Sept 19) 1928), in advocating conservative surgery. In a series of cases the only treatment was the ligation of the accessory vessels which were obstructing the ureter. Two of their patients are entirely well after 16 and 19 years. Likewise, conservative surgery is practiced by J. D. Barney (New England J Med 198 661 (May 17) 1928), who in *hematogenous infection* does a **decapsulation with drainage of the cortex**, in *pyonephrosis* a **nephrostomy** may give good results. In *traumatic rupture* the injured kidney may be the only one the patient has, therefore examination must be made to determine whether or not the other one is present.

Conservation of the diseased kidney is always paramount in the mind of Alex. von Lichtenberg, who discusses surgery of the renal pelvis and ureter (J A M A 93 1706 (Nov 30) 1929). Urinary obstruction is divided into 3 classes: (1) Obstruction at the uretero-pelvic junction, (2) along the course of the ureter, (3) in the intra-



mural portions of the ureter, and at the opening into the bladder

*Renal function* in urologic surgery is discussed by H G Bugbee (J Urol 20 541 (Nov) 1928) The author reviews 171 cases of prostatic obstruction, and finds that the best results were obtained when treatment was guided by tests for renal function After the operation, kidney function tests indicate the progress of the recovery That life is possible when only a small portion of normal kidney tissue remains following resection is discussed by A J Scholl (Ann Surg 88 1045 (Dec) 1928)

**NEPHROTOMY**—The longitudinal incision in the zone of Hyrtl, is advocated by C L Deming (Am J Surg 4 424 (Apr) 1928) not because it is bloodless, but because it avoids the larger vessels and gives good exposure of all the calices In experimental work, the author finds the circulatory changes can be definitely demonstrated by means of casts of the arteriovenous system made by the injection of celluloid acetone solution That secondary *hemorrhage* following nephrotomy is due to an error in technic was expressed by Rosenstein at the meeting of the Berliner Medizinische Gesellschaft (Med Klin (July 6) 1928) After animal experimentation, he decided to ligate the vessels in the columns of Berlin, refraining from putting in any parenchymatous sutures Since then he has not experienced secondary hemorrhage

**NEPHROPEXY**—That nephropexy does have therapeutic value is claimed by W Billington (Brit M J 2 975 (Dec 1) 1928) who reports a series of 1500 cases Reports from 100 patients at least one year after operation re-

vealed that 60 per cent needed no further medical attention, 20 per cent were considerably better, 10 per cent were better and 10 per cent had not improved.

**OPERATIVE COMPLICATIONS.**—Complete *ligation of the inferior vena cava*, because of operative injury occurring during a nephrectomy, is reported by M Patel and R Peycelon (Lyon chir 25 22 (Jan-Feb) 1929) The patient made a complete recovery The authors discuss the venous return in detail and conclude that the anterior approach, which gives the best exposure of the inferior vena cava, is to be recommended in operations for enormous renal swellings

Accidentally *severing the ureter and pelvis from the kidney* in operating for renal calculus is reported by H Bailey (J Urol 20 103 (July) 1928) Because a stone was present in the other kidney a transverse incision was made in the hilum of the injured kidney and the pelvis **sutured** back in place The suture was reinforced with a small strip of muscle The function of the injured kidney was greatly diminished after operation but was sufficient to permit removal of the calculus from the other kidney

In a review of 370 cases of renal surgery, C P Mathé (California and West Med 28 57 (Jan) 1928) found the more common complications were *shock* in 10 cases, *hemorrhage* in 10, *cardiac complications* in 4, *phlebitis* in 9, *urinary fistula* in 6, *anuria* in 2, *pneumonia*, *septicemia*, *cervical neuritis* and an *overlooked abscess* of the kidney in 1 each

Pre- and post-operative care are as important as operative skill and judgment in lowering the mortality A

careful determination of renal function is essential

To avoid some of the technical pitfalls, he suggests a wide crescentic incision from the twelfth rib to the antero-superior spine of the ilium and beyond, severing the costovertebral ligament, avoiding excessive traction and blood loss, careful blunt dissection in separating the pleura, peritoneum, liver or other viscera, the use of a stabilizer raising the lumbar region from below, keeping the lower leg flexed and the upper leg extended, and producing counterpressure on the abdomen from below. This approach gives the best exposure even when the kidney is high or the pedicle short. The renal vessels should be doubly ligated, individually if possible, and if they cannot be separated, the pedicle should be doubly clamped *en masse* and doubly ligated as the clamps are released. For the success of conservative renal surgery, the elimination of stasis is essential.

*Renal insufficiency* may occur following operations other than those of the urinary tract. It is fairly common following radical operations for carcinoma of the lower colon and rectum. Recovery usually follows early recognition and prompt treatment, according to E. G. Bannick and N. M. Keith (M. Clin. North America 11: 1571 (May) 1928). In the cases reviewed the chief signs of urinary insufficiency were oliguria and increase in blood urea, edema developed later if at all. Blood-pressure was normal and abnormal conditions of the urine were inconstant. All were toxic however. In most of these patients there had been partial bowel obstruction for prolonged

periods before operation and in all there was some infection of the operative field. These conditions, combined with more or less cachexia, may explain the development of the urinary insufficiency.

Lesions of the kidney were variable, in no case was there typical acute glomerulitis and in several cases renal structure appeared almost normal. The clinical course was similar to that of diffuse degenerative renal lesions. This type often occurs in association with different toxemias. A liberal fluid intake of 2500 to 3000 c.c. (5 to 6 pints) daily and the use of diuretics of the caffeine type usually produce satisfactory diuresis. Frequently the best results were obtained when some of the fluid was given intravenously in the form of hypertonic glucose solution.

*Paralysis of the intestine* and acute dilatation of the stomach with signs of occlusion of the duodenum are 2 other frequent complications discussed by S. N. Lissowskaja (Arch. d. mal. d. reins 3: 231 (Feb.) 1928). They occur more frequently after renal than gastro-intestinal operations, usually appear on the third day, and occasionally terminate fatally. Their severity is not proportional to the seriousness of the operation. Three cases of apparent duodenal occlusion are reported. The apparent explanation of this phenomenon is the relation of the renal aponeurosis to the abdominal vessels, solar plexus and semi-lunar ganglion. The aponeurosis helps to form the vessel sheaths and is in immediate contact with the nerve plexuses and ganglia serving the vessels. Renal trauma, especially on the left, thus affects these structures. Blood or infection in the peri-

renal fat may extend along the vessel sheaths affecting the solar plexus with resultant intestinal paralysis. It requires 2 or 3 days for this mechanism to occur. Occlusion of the duodenum is probably due to the increased volume of the superior mesenteric vessels through the same mechanism extending along the sheaths of these vessels, compressing the third portion of the duodenum. Thus both conditions can occur simultaneously.

C L Deming (J Urol 20 713 (Dec) 1928) asserts from extensive experience that renal circulation is not impaired following elongation of a pyelotomy incision straight on to the kidney and to the lower pole if the retro-pelvic vessels are conserved. Angulated incision causes a definite shrinkage of the kidney. Elongation of the pyelotomy incision to the lower pole near the midline is the incision of choice. In suturing the kidney, no large vessels should be included. Ligation of the retropelvic vessels causes renal injury.

**Secondary nephrectomy** is discussed by A H Crosbie (J Urol 19 181 (Feb) 1928). The treatment of *acute pyonephrosis* is rendered safer by preliminary drainage under local anesthesia. In such cases nephrectomy can be delayed as long as 3 weeks, where patients are too septic to stand radical operation.

A *duodenal fistula* following nephrectomy is reported by P Marogna (Ann ital di chir 6 657 (July) 1927). The patient, a male, 45 years old, had renal colic with pyonephrosis. The x-rays revealed calculi. On the fourth day after operation a perforation in the duodenum through which bile was discharged was found. The

duodenal perforation was successfully closed by direct extraperitoneal suture. Such injuries, often fatal in final result, have not infrequently followed the ligation of the right renal pedicle.

**KIDNEY TESTS.**—Merely a catalogue of the names of kidney tests would occupy quite a few pages. To describe their technics would require a large volume. Hence, in this brief space very little more can be done than to indicate general trends. The *phenolsulphonphthalein test* certainly remains as reliable as ever. Estimation of the *blood urca* or the *blood urca nitrogen* under standard conditions is also of the same value as before. And yet new tests are constantly appearing. Ordinarily when a disease has a large number of remedies recommended, it means that none are of real value. In the case of these tests, however, many of them are reliable. Apparently the urge to discover is hard at work in this field.

A A Epstein (Ohio State M J 23 731 (Sept) 1927) sums up the fundamentals of the methods in some such manner. Certain known chemicals foreign to the body are introduced and recovered in the urine. Certain known substances manufactured in the body are studied in relation to their intake, level in the blood and excretion in the urine. Certain substances manufactured by the kidneys themselves, such as hippuric acid and ammonia, are studied. He goes on to remark that nephritis is a very complicated clinical picture in which, to be sure, the kidneys play the important part, but not the only one, other organs and tissues modify conditions.

An important point to bear in mind is that there is incomplete agreement among physiologists as to the details of kidney function, pathologists and physiologists have not even begun to agree. Therefore it seems that in the performance of all these tests of renal function, the fundamentals of kidney function should be kept in mind with a view to elucidating some of the problems.

From the experimental point of view, A. N. Richards and A. M. Walker (Am J Med Sc 176 899 (Dec) 1928) conclude that 2 dyes, *phenolsulphonphthalein* and *indigo carmine*, are eliminated by the glomeruli as by filtration through a membrane impermeable to protein. From other experiments, they also state that the volume of glomerular elimination is sufficient to account for all of the dye which a frog's kidney excretes.

A. Bolliger (Arch Int Med 41 642 (May) 1928), using sodium thiosulphate, sodium iodide and phenolsulphonphthalein states that *sodium thiosulphate* is a very reliable functional test material. He is confirmed

by others such as Silberstein, G. Humbert and F. Finck (Presse med 36 417 (Apr 4) 1928), etc. Ten cc of a semi-normal solution are injected intravenously and the excretion measured.

By giving alkali (*sodium bicarbonate*) by mouth and measuring the rise in the alkalinity of the urine, several observers conclude this is a good test of renal function. Twenty Gm (5 drams) of the bicarbonate are given in 400 cc ( $\frac{1}{5}$  pint) of water. It must be remembered, however, that many internal factors influence the alkalinity of the urine.

R. T. Brain and H. D. Kay (Quart J Med 22 203 (Jan) 1929) give *sodium glycerophosphate* (representing 550 mg— $8\frac{3}{4}$  grains—organic phosphorus) intravenously and measure its excretion.

Numbers of reports appear on the ability of the kidneys to concentrate *urea*, either normally produced urea or an addition of urea by mouth. Under rigid conditions, these tests seem very satisfactory, but are more complicated than some others.

## L

**LABYRINTH.**—According to G. Portmann (Proc Roy Soc Med (Sect Otol) 21 97 (Oct) 1928) *vasomotor disturbances* may be considered as among the most pathognomonic and the most important affections of the internal ear. The symptoms are vertigo, caused by sudden vasodilation following spasm such as occurs in the syndrome of Lermoyez, or by a pronounced ischemia of the labyrinth, such as occurs in Ménière's disease, tinnitus, indicating cochlear

involvement, vestibular irritability, and deafness. The causes of vago-sympathetic troubles, and therefore of labyrinthine vascular spasms may be mechanical, endocrinal, toxic or psychic. He believes that the most important causes acting on the regulating apparatus are the action of the nervous system and the action of the endocrine glands, especially the suprarenal.

D. W. Drury (New England J Med 200 173 (Jan 24) 1929) reports

in detail 3 cases of the Ménière's syndrome of endocrine origin, and 1 case not of endocrine origin. In the former there was thyroid insufficiency and all of the symptoms disappeared on the administration of thyroid extract. He states that when by close laboratory and clinical study an endocrine diagnosis is established, it will be found to be hypofunctional in character and never hyperfunctional. He believes that in cases without symptoms of dysfunction the cause lies in a general systemic disturbance.

A. W. Crane (Radiology 11 447 (Dec) 1928) calls attention to the frequency with which cases of *Ménière's disease* came for examination of the gastro-intestinal tract.

W. E. Dandy (Arch Surg 16 1127 (June) 1928) proposes a new treatment for Ménière's disease consisting of intracranial section of the acoustic nerve on the affected side. He believes that the disturbance in the disease lies in the nerve itself and not in the semicircular canals. Nine cases are reported by him and the patients were all free from the attacks, from 3 months to 3½ years after the operation.

*Labyrinthitis* may be either circumscribed or diffuse, serous or purulent and the prognosis of this serious complication of middle ear disease depends on which type is present. In circumscribed labyrinthitis, encapsulation of the infection takes place. However, operative procedures in the middle ear may convert a circumscribed labyrinthitis into the diffuse form with resulting meningitis and death. Serous labyrinthitis may follow mastoid operation and is due to an exudation and coagulation of labyrinth fluid in the canals, no organ-

isms are present and the cases usually recover.

Purulent labyrinthitis should be operated as soon as the diagnosis is made. In this type the function of the labyrinth is gone and deafness occurs suddenly and is complete. Drainage should be established in the inner ear by a radical mastoid and labyrinthine operation.

#### LACRIMAL SAC.—GANGRENOUS PERIDACRYOCYSTITIS.

—A case of gangrenous peridacryocystitis is reported by R. DeC. Ruiz (Med Ibera 12 287, 1928), who has never before seen a case like this and has found only 3 similar cases in the literature. A woman 23 years of age consulted the author because of intense pain at the inner angle of the right eye associated with marked swelling which had begun 5 days previously and a dark discoloration which was first noted the day before. When the swelling began, her physician had diagnosed the condition as acute dacryocystitis and had prescribed the application of hot fomentations. On the third day the abscess opened spontaneously and discharged a large amount of fetid pus, but the pain increased and 2 days later a large area of black and fetid gangrene appeared. This area extended from the inner angle of the eye to the middle of the lower eyelid.

Under chloroform anesthesia the gangrenous area was cauterized, the wound filled with iodoform gauze, and an injection of 10 c.c. of anti-gangrene serum was given. After several days of washing with hydrogen peroxide, the re-application of iodoform gauze, and further injections

of the anti-gangrene serum, the wound began to heal

**DACRYOCYSTORHINOSTOMY.**—J Baszerra (Med iberica 1 545 (Apr 27) 1929) records his observations on 283 cases of dacryocystorhinostomy, which he has performed in the course of the last 4 years for the treatment of *dacryocystitis*. His results were as follows: Complete success in 85 to 88 per cent, relief or partial cure in 8 to 10 per cent, and failure in 5 to 7 per cent. Although the immediate results were excellent in every case, in some instances there was a return of the symptoms after an interval ranging from 48 hours to a month after the operation. In view of the satisfactory results obtained Baszerra comes to the conclusion that extirpation of the lacrimal sac in dacryocystitis should only be performed when dacryocystorhinostomy is contraindicated, or in a patient who, owing to advanced age and persistence of epiphora, does not wish to submit to a prolonged operation.

**LYMPHOMA**—H I M Weve (Nederl Tijdschr v Geneesk 1 696 (Feb 11) 1928) states that tumors of the lacrimal sac are very rare. He reports a case which occurred in a woman aged 59 years, who had suffered from lacrimation for a year, but had only had a swelling of the lacrimal sac for 6 months. The blood picture was normal, but the patient had had an enlarged cervical gland for 6 months. **Totri's operation** was performed and a yellowish gray nodular tumor was extirpated. The growth was either a round-celled sarcoma or a lymphoma.

**Dilatation of the Lacrimal Duct.**—In an attempt to find a substance stiff

enough to be pushed into the lacrimal duct which will swell in moist tissue, A L Brown (Arch Ophth 57 397 (July) 1928) discovered that these requirements are met by a piece of sea tangle about 3½ inches long with the caliber of a No 1 Bowman probe.

**DISLOCATION**—Van Heuven (Nederl Tijdschr v Geneesk 2 3566 (July) 1928) reports a case of coloboma and pedunculated fibroma of the upper eyelid in a 6 months' old child, associated with a white tumor, having an elevation of about 2 mm, overlying the upper and part of the lower temporal quadrant of the cornea.

**LARYNX**—*Acute laryngitis* may be caused by a number of organisms such as non-hemolytic streptococcus, the Klebs-Loeffler bacillus, influenza bacillus, etc. In treating these cases, where dyspnea due to obstruction becomes marked, it is necessary to resort to either intubation or tracheotomy. H L Baum (J A M A 91 1097 (Oct 13) 1928) found it necessary to introduce a tube to prevent asphyxiation on 24 cases of acute laryngo-tracheo-bronchitis. He states that these conditions usually begin as an acute rhinitis and pharyngitis with a dry, croupy cough. When the subglottic swelling of the mucous membrane becomes severe enough to produce obstructive symptoms, intubation should be done. R McIntosh and K D Nichol (J A M A 90 2095 (June 30) 1928) report 5 cases of abscess of the larynx in infants, all of whom recovered after draining the abscesses externally.

H R Landon (Arch Otolaryng 10 16 (July) 1929) defines *herpes laryngis* as an acute condition characterized by pain in the throat, which is

intense in swallowing, a variable degree of hoarseness and the appearance in the larynx of a number of vesicles. The posterior wall is the site of predilection. The lesion consists of a vesicular eruption which affects the aryepiglottic folds, the epiglottis, and the arytenoid area. The true and false cords usually escape, but the lateral walls of the pharynx and the base of the tongue are often affected.

The larynx may become suddenly occluded by *ascaris lumbricoides* as was noted in the case reported by M. B. D. Dixey (Edinburgh M. J. 36 111 (Feb.) 1929) and which resulted in death of the patient. At autopsy 2 large worms were seen to be protruding from and completely occluding the larynx.

The most common chronic inflammations are *syphilis*, *tuberculosis* and *rhinoscleroma*. Syphilis in the secondary stage usually shows symmetrical yellowish or grayish patches on the cords, or the lesions may be diffuse in the larynx. One sees a similar picture in non-specific laryngitis, especially when the patient uses the voice a good deal. In tertiary lues, the lesion is markedly hyperemic and the involvement of the cord does not produce fixation as seen in carcinoma. Ulceration occurs early and there is very little pain, even in the advanced cases. Wassermann reaction is positive and patient may exhibit other evidences of lues. The lesions respond promptly to **antisyphilitic treatment**.

*Tuberculous laryngitis* is usually secondary to a pulmonary condition. E. Wessely (Wien klin Wchnschr 42 176 (Feb 7) 1929) reports that of 715 patients with tuberculosis of the larynx 503 were men and 212 women.

Forty per cent of the patients were less than 20 years of age. The disease usually begins in the inner arytenoid area. Edema is present early and the involved area looks pale. The ulcerations occur rather early and are superficial. Secondary infection frequently invades the perichondrium when ulceration takes place, and a perichondritis of the arytenoids results with fixation of the joint. In these cases pain and dysphagia are present.

**Absolute rest** to the diseased structures is of paramount importance in tuberculous laryngitis. These patients should **absolutely refrain from speaking**. In most cases of *early laryngeal tuberculosis* **vocal hygiene** together with some form of **light therapy** suffice to clear up the condition. For extensive infiltration and ulceration **electro-coagulation** is helpful, and in the hands of E. A. Looper and L. V. Schneider (J. A. M. A. 91 1012 (Oct 6) 1928) the use of the **electric cautery** had been so successful that it is preferred to all other methods. Its use was followed by improvement with healing in 65.5 per cent of the cases with moderate lung involvement and in 26.5 per cent of those in whom the lung condition was far advanced. The cauterization is done under local anesthesia by the indirect method at monthly intervals.

Dysphagia can be controlled by dusting **orthoform powder** on the ulcerated area about fifteen minutes before meals. Lactic acid is also used locally in 5 to 60 per cent aqueous solution. The areas must be anesthetized first with **cocaine solution**. In cases where the dysphagia is very severe and where the patients slowly starve because of their great distress

in swallowing, alcoholic injection of the superior laryngeal nerve is resorted to, or resection of the nerve may be necessary

C L LaRue (South M J 21 344 (May) 1928) states that the development of *laryngeal tuberculosis in a tuberculous patient* greatly reduces the chances of recovery. He has found that 2 of every 3 persons afflicted with pulmonary tuberculosis without a laryngeal complication will make a permanent recovery, whereas only 1 of every 3 developing laryngeal tuberculosis will recover permanently

*Rhinoscleroma*, though of very rare occurrence, must be considered in pathology of the larynx as it may be confused especially with syphilis and carcinoma. Diagnosis is made on culture of the discharge and biopsy

*Laryngeal papillomata* usually occur in early childhood, and have a great tendency to recur. Cough and dyspnea are the early and chief symptoms. According to A F Holding (New York State J Med 29 271 (Mar 1) 1929) the most satisfactory treatment is **endolaryngeal removal**, with adjuvant treatment of inhibitory doses of **radium** and **x-ray**. Some authorities deprecate the use of radium and roentgen ray. According to Clerf untoward effects such as perichondritis, loss of cartilage, extensive fibrosis and cicatricial stenosis of the larynx follow its use.

The earliest symptom of *cancer* of the larynx is hoarseness. The lesion usually appears on the middle third of one cord, never on both simultaneously. When incipient, the growth is well localized. Pain and ulceration occur rather late, and immobility of the cord comes on early. Wherever possible a biopsy should be done. J

E Mackenty (Arch Otolaryng 9 237 (Mar) 1929) states that *malignant disease of the larynx* is becoming more frequent and developing much earlier in life than formerly. From a surgical standpoint the exact location and extent of the cancer extrinsic, intrinsic or borderline intrinsic, are of great importance. In the author's experience, radium has been an utter failure for treatment in cases of squamous cell laryngeal cancer. Of over 700 cases studied by him, 80 per cent were intrinsic and curable in the beginning. Two hundred and thirty cases were treated surgically with a mortality of below 3 per cent. Recurrences in incipient cases occurred in 3 per cent of the patients after laryngectomy and in 35 per cent after thyrotomy. In extrinsic cancer, recurrences occurred in almost 100 per cent.

According to Sir St C Thompson (Proc Roy Soc Med 21 1792, 1928), **laryngofissure** gives an excellent result in intrinsic cancer of the larynx. The author reviews 70 cases. Thirty-four of the patients are still living from 3 to 19 years after the operation. Most of the recurrences appeared within the first year. When a recurrence develops in a borderline case, he advises **laryngectomy**.

*Paralysis of vocal cords* may be myogenic, functional, or neurogenic in origin, the former two usually involve the adductors or the muscles of phonation. When the abductor muscles are involved the etiologic factor is most likely neurogenic.

*Paralysis of the abduction muscles* when bilateral necessitates **surgical intervention**, for complete paralysis of both of them will prevent separation of the cords and almost completely



prevent the entrance of air into the lungs. **Tracheotomy** is often resorted to in this condition. F. H. Lahey (Ann Surg 87 481 (Apr) 1928) reports a case of successful **direct anastomosis of the right recurrent laryngeal nerve** in a case of bilateral abductor paralysis following 2 months after a subtotal thyroidectomy. J. E. MacKenty (Arch Otolaryng 8 37 (July) 1928) states that *syphilis* is the common cause of abductor paralysis. He describes a new operation which aims at the establishment of a small permanent tracheal opening just above where the trachea dips backward into the chest. This operation is not intended to supplant Jackson's ventriculocordec-tomy, but may be used as an intermediate procedure between this and tracheotomy.

**LEAD POISONING.—ETIOLOGY**—The commoner sources of lead poisoning are understood quite well, such as occurs among printers and those engaged in white lead factories. It may be due to lead which has been taken up by water or other beverages, from lead pipes or vessels in which it has been contained. Occasionally other sources of such poisoning are read about in the literature. Ten cases of lead poisoning which occurred among bronze foundry workers are reported by Pedley and Sproul (Canad M A J 19 566 (Nov) 1928). W. W. Haagen (Deutsche Ztschr f Chir 215 39 (Mar) 1929) reports a case of lead poisoning due to the presence of 6 or more fragments of a lead missile in the knee of the patient. Lead poisoning of infants has been, in many cases, found to be caused by the white face powder used by nursing mothers. R. J. Reitzel (Ann Int Med 3 378 (Oct) 1929) reported 4 cases of lead poisoning from snuff. The patients all used the same brand of snuff.

**DIAGNOSIS**—Early diagnosis of lead poisoning has been reported by A. Seitz (München med Wchnschr 75 1544 (Sept 7) 1928). He states that too much impor-

tance must not be laid on the so-called cardinal symptoms. A falling hemoglobin percentage is a more constant sign than the characteristic color of the skin of the face. The blue line cannot be considered an early sign. *Ieter ex ore* is a sign not so much of lead poisoning as of a neglected mouth. He attaches great importance to increase in the number of vitally stained erythrocytes (over 0.5 per cent) as a prodromal symptom.

K. Gutzeit (München med Wchnschr 75 1623 (Sept 21) 1928) calls attention to gastritis as a frequent manifestation of lead poisoning. In 15 cases hypertrophic gastritis was found 9 times, superficial catarrh 4 times and atrophic changes twice.

**PATHOGENESIS**—Lead is absorbed by the skin, the gastro-intestinal tract and the respiratory organs. The largest amounts are absorbed in the upper portions of the small intestines. The distribution of lead in the organism, according to the investigations of S. Litzner (Med Klin 25 1462 (Sept 20) 1929) shows that the vascular system, liver, kidneys and intestines are affected first.

R. W. Brookfield (J Path and Bact 31 277 (Apr) 1928) discusses the blood changes in lead poisoning. A definite anemia results. It is due to peripheral destruction of red blood cells by the lead. No change definitely attributable to lead has been found in the white cells.

**TREATMENT**—The first object should be to remove the lead from the circulating blood, according to Litzner (*loc cit*). Since it cannot all be eliminated, its deposition in the bones should be stimulated. In order to effect this, the patient should receive large quantities of **milk** and **calcium**. The diet should be **alkaline** and should provide **green vegetables**, **fruits** and **eggs**. Medicaments that effect the elimination of lead, such as potassium iodide are contraindicated because they counteract the reduction of the lead content in the blood. After the acute symptoms disappear, an **acid diet** should be given in order to remove the lead from the body. The diet should consist of **meat**, **liver**, **potatoes**, **tea** and **coffee**. For medication the author recommends either a solution of **phosphoric acid**, **ammonium chloride** or **potassium iodide**.

**LEISHMANIASIS.** See KALA-AZAR.

**LEPROSY.—ETIOLOGY AND PATHOLOGY.**—Etiological factors in leprosy as stated by G W St C. Ramsay (Tr Roy Soc Trop Med and Hyg 22 249 (Nov) 1928) are scabies, intestinal worms, such as hookworms, ascarides, whip-worms, and nasal discharge

A Glingani (Gior med dell' Osp Civ di Venezia (Nov) 1927) concludes that leprosy is contagious as a result of prolonged association with a leprosy individual. He is inclined, also, to attach great importance to hereditary transmission and infection of adults through the genital tract

E L Walker (J Prev Med 3 167 (May) 1929) feels that leprosy probably is primarily an infection from the soil

Bone changes in leprosy, as described by R Hopkins (Radiology 11 470 (Dec) 1928) are most marked in the phalanges of the extremities and the nasal septum. There may be absorption of the bone without any evidence whatsoever of inflammation of the overlying tissues

The blood picture, as shown by L de Marval (Semana méd 1 1034 (Apr 26) 1928), exhibited only a relative and absolute mononucleocytosis, with a tendency to a very slight leukopenia. A relative and absolute eosinophilia seemed to occur as a result of the leprosy and not to be due to concomitant animal parasitism

M C Cruz, C B Lara and E M Paras (J Philippine Islands M A 8 216 (May) 1928), in a study of 70 lepers, showed that the serum calcium in leprosy is usually within normal limits

T C Boyd and A C Roy (Indian J M Research 15 643 (Jan) 1928) found the cholesterol content of whole blood in lepers to be reduced

**DIAGNOSIS**—E Marchoux and J Caro (Ann de l'Inst Pasteur 42 542 (May) 1928) describe the technic of *Rubino's serologic test* for leprosy. They applied the test in 10 definite cases and obtained positive results in 5. All serums, except those from lepers, always gave negative results

*Sedimentation test* in leprosy has been found to be markedly accelerated. As a result of a study of 67 cases of leprosy, E A Molinelli (Semana méd 2 337 (Aug 9) 1928) reached the following conclusions: (1) The sedimentation of the red blood cells was increased in 77 per cent of his cases, (2) there was no relation between the degree of sedimentation and the duration of the disease, intensity of the disease, and general state of the patient, (3) the sedimentation was greatest in cases complicated with ulceration and nephritis, (4) only in 45 per cent of the cases was there a parallelism between the sedimentation increase and the evolution of the clinical aspects of the disease. The author believes that sedimentation of the red blood cells is of distinct value in the study of leprosy and should form part of the diagnostic procedure in the disease

The *lepra bacillus* has been found in the fluid from blisters produced by CO<sub>2</sub> snow, according to E Schropf (Dermat Wchnschr 82 773 (June 5) 1926).

**TREATMENT**—Chaulmoogra oil occupies first place in the treatment of leprosy in the O E Denney institution (Pub. Health Rep 44 534 (Mar. 8) 1929), where it is used in-

intramuscularly with benzocaine, the average dose being 5 c c (80 minims) given bi-weekly

Some preparation of chaulmoogra oil is quite generally used B. de Vera and C B Lara (J Philippine Islands M A 9 307 (Sept) 1929), tested the efficacy of ethyl chaulmoograte, ethyl hydnocarpate and ethyl esters of total fatty acids of hydnocarpus wightiana oil in leprosy The results indicate that the single esters are superior to the mixed esters, probably due to their higher content of active constituent per given volume

A preparation of the esters of chaulmoogra oil, which can be given by mouth has been used by N E Wayson and L F Badger (Pub Health Rep 43 2883 Nov 2) 1928) for the past 6 months in 25 patients, without discomfort to the patient, and without noticeable gastro-intestinal symptoms The preparation is an emulsion in acacia and simple syrup of equal parts of the mixed esters of chaulmoogra oil, and of cod-liver oil to which iodine is added to make 0.06 per cent Tentatively, the maximum dosage to be used has been set at 10 c c (2½ drams) of esters weekly per 100 pounds' weight of patients

C Maturana Varagus (La Clinica, Sept, 1927) says treparsol and ethyl chaulmoograte seem to exert a beneficial action in leprosy In any case where there is a sign of intolerance, it should be given in the dose of 0.5 Gm (7½ grains) every day in water, for 8 days, with 4 days intermission, and so on Ethyl chaulmoograte is given by intramuscular and intravenous injection, but the author has used only the latter route, using 1, 2 or 3 c c (16, 32 or 48 minims) each time

for 2 or 3 days until results were obtained

The intravenous treatment of leprosy with potassium iodate has given excellent results, according to G Olpp (Munchen med Wchnschr 76 13 (Jan 4) 1929)

Ephedrine by mouth gives almost instantaneous relief from nerve pains that accompany fever in leprosy, as reported by R G Cochrane (Lancet 2 551 (Sept 14) 1929)

The plancha or infiltration method of multiple intradermal injections of the usual antileprosy drugs directly into leprosy skin lesions with intramuscular treatment has been found by C B Lara and C Nicolas (J Philippine Island M A 9 321 (Sept) 1929) to be more effective than are the intramuscular and the subcutaneous methods

Therapy, vaccines, various proteins and ultra-violet rays are among the treatments which have been used, but which have shown no very decided therapeutic action

Gold sodium thiosulphate used intravenously is reported by J L Kirby-Smith (South M J 22 637 (July) 1929) to have given good results

Ionization treatment of leprosy infection of nasal mucosa with a 1 per cent solution of sodium salts prepared by saponification from pure creosoted hydnocarpus oil has been used by F G Rose (Brit M J 1 148 (Jan 26) 1929), with marked lessening or disappearance of the *lepra bacillus* in the nasal mucosa

**LEUKEMIA.—ETIOLOGY**—Studying the etiology of all the acute leukemias, A S Rubnitz (J Lab and Clin Med 14 497 (Mar) 1929) sees

no reason for their division into *myelogenous* and *lymphogenous* types, as clinically they represent one and the same entity. Microscopically one cannot always draw the line between them, and the oxidase reaction is only of value if positive. He believes that although they are always associated with infections, they are not caused by any specific micro-organisms. It is his contention that some obscure toxin liberated by the necrotic mucous membranes is the offending factor.

**PATHOLOGY**—G. Macciotta (Clin pediat 10 385 (July) 1928) emphasizes that not only the hemopoietic system but every principal organ, particularly the liver, spleen and the endocrine system, is involved in leukemic children. He also notes that the clinical changes do not occur parallel with the manifestations seen in the bone marrow. Following a primary phase of hyperactivity of the bone marrow it assumes a dark red color with a reduction in the amount of fat and a replacement by a granular amorphous material. Changes in the mediastinal and mesenteric glands were most notable but even these were not excessive. The thymus gland frequently undergoes a marked degeneration and caseation with a reduction in weight and volume. The spleen being enlarged at times attains a weight of 1000 grams, while the liver often exceeds 1200 to 1500 grams. Histologically there are 3 prominent features: (1) a return of the hemopoietic activity to the production of immature cells of the white series, (2) marked changes in the liver cells particularly a vascular degeneration, and (3) an increase in perivascular fibrosis, frequently resulting in a vascular obliteration. In all the

author's cases he was able to demonstrate modifications of the acinus and endocrine tissues of the pancreas similar to those described in the liver and the spleen.

The suprarenal glands gave evidence of a return to the embryonic hemopoietic activity, while the thyroid showed a sclerotic process which notably reduced the amount of glandular tissue. The parathyroids exhibited a slight degree of sclerosis of the connective tissue while the genitalia presented no changes.

**DIAGNOSIS.**—To confirm such an opinion and emphasize the difficulty of differential diagnosis, S. L. Warren (Am J M Sc 178 490 (Oct) 1929) reports 28 new cases in which 24 per cent were diagnosed as acute *myelogenous* leukemia, 32 per cent as *lymphogenous*, 34 per cent as acute leukemia, and 10 per cent as special forms, yet they all presented the typical text-book picture of an acute leukemia syndrome, onset with weakness, a coryza or some obscure infection, fever, prostration, bleeding, purpura, adenopathy, splenomegaly, leukocytosis, anemia with leukemic masses and fatal termination. The difficulty arises in the differentiation of these immature white blood cells. At different stages during the illness, the predominating leukocyte may change from the large granular myelocyte giving a positive oxidase reaction to the smaller non-granular lymphoblast and *vice versa*.

A peculiar change has occurred in the trend of diagnosis of these cases. Before 1910, the diagnosis of acute *myelogenous* leukemia was quite popular and frequently made, the non-granular cells being referred to as myeloblasts. For the following 10

years, the pendulum swung in the opposite direction and the diagnosis of the lymphogenous form became more popular with the myeloblast completely ignored or forgotten. At present the clinician and pathologist are both more cautious about such diagnoses and many cases are simply called *acute leukemia*.

In attempting to give an explanation of the origin of such enormous numbers of leukocytes, the pathologists are frequently at a loss and can only state that the conditions represent systemic involvement of all the blood-forming organs and all the lymphoid tissues with secondary involvement of the other organs of the body.

According to Warren (*loc cit*), acute leukemia seems to be a disease of *males*, as the ratio of cases is 2 males to 1 female. In those cases in which there was a fatal termination in less than 2 months, 61 per cent were in males, while in those who had the disease from 3 to 6 months, 76 per cent were males. Between the ages of 45 and 50 years the ratio was 3 to 1, the females predominating, which was taken to be the period of the menopause.

Three very common complaints are seen in the majority of these cases at the outset. *Sore throat* and *enlarging tonsils* enlist the aid of a specialist whose operation, if he is unaware of the underlying condition, may lead to serious hemorrhage. Ulcerative stomatitis is frequently seen in the early stages and in another group of cases the history of a *respiratory infection* precedes the leukemia.

B. L. Crawford and E. Weiss (Am J M Sc 175 622 (May) 1928) believe a large number of cases of leu-

kemia do not run a rapid progressively fatal course, but have an insidious onset and run a gradual course of several months before a fatal termination. Frequently they resemble typhoid fever or subacute bacterial endocarditis, showing necrotic process in the mouth or throat, fever and progressive anemia. According to these writers, the differentiation of the lymphocytic and myelogenic origin of the cases is of only secondary importance.

C. Aubertin and P. Grellety-Bosviel (Bull et mém Soc med d hôp de Paris 52 1000 (June 14) 1928) have discovered that the subcutaneous injection of 1 mg of adrenalin causes a contraction of the spleen and a slight and transient leukocytosis in healthy individuals. In *myeloid* leukemia this injection brings about a marked leukocytosis from 100,000 to 250,000 which lasts more than 6 hours in contrast to the normal period of 2. There is in such cases a predominance of myeloblasts and myelocytes. In cases of treated leukemia, the myelocytes and myeloblasts occur in the blood stream almost immediately. Thus the absence of such a reaction differentiates the *aleukemic splenomegaly* occasionally seen.

L. R. Pearson (J Indiana M A 20 17 (Jan) 1927) states that *lymphoid* leukemia occurs in a ratio of about 1 to 10 as compared with the *myeloid* type. The lymphoid form is found about 3 times as often in males as in females. The greatest age incidence is 45 to 55 years. The duration of the disease preceding a fatal termination is usually from 3 to 5 years, irrespective of the form of treatment.

R. A. Hickling and W. D. Sutliff

(Am J M Sc 175:224 (Feb) 1928) report a case of *chronic lymphatic leukemia* existing with a lobar pneumonia. From this case he found there was an absolute polymorphonuclear leukocytosis. Specimens of blood serum taken after recovery showed the presence of protective antibodies for the homologous organism. No agglutinins were to be found.

**PROGNOSIS**—E T Leddy (Am J Roentgenol 21:250 (Mar) 1929) states that leukemia, like all other forms of lymphoblastomas, is generally fatal in from 2 to 3 years in spite of any form of treatment.

**TREATMENT**—W L Brown (Am J Roentgenol 19:15 (Jan) 1928) reveals that the fatal termination of leukemia is the most disappointing feature. Thus practically all therapeutic agents are employed for symptomatic and palliative reasons. At present **radium** and **x-ray** are our greatest allies and when applied over the lymph nodes and blastic tissues a marked remission and improvement in symptoms occurs. The white count is lowered, the hemoglobin and red count improve and there is a reduction of the enlarged lymphatics of the liver. Of 22 cases which the author has studied, no ill effects have been found from the use of radium, but no beneficial effects were to be derived from its use in acute cases. Repeated blood examinations are necessary to control the frequency and dosage of radium and poor results are often due to prolonged interval between treatments. When a relapse does occur, radium or x-ray are of little value.

Leddy (*loc cit*) has found that **radiotherapy** will produce remissions

in about 50 per cent of cases for an indefinite period and may even eliminate symptoms. Slow irradiation of the spleen and entire body is best, the large doses of **radium** and **x-ray** being reserved for the refractory periods.

M Strumia (Am J M Sc 177:676 (May) 1929) cites 2 cases of leukemia to prove that the action of **radium** upon the leukemic individual is both a general and a local one. He believes that the application of radium to any part of the body results in the emanation transportation to the leukopoietic foci, with a resulting direct and indirect action on the body. He concludes by stating that the important feature is the size of the dose and not the location at which it is given.

**ALEUKEMIC LEUKEMIA**—H Pinkerton (Arch Path 7:567 (Apr) 1929) reports 5 cases of aleukemic leukemia. Anatomically these cases presented a hyperplasia and an extreme anaplasia of the bone marrow and the presence of foci of myeloid cells in the viscera. These changes are not entirely characteristic of aleukemic leukemia as they may occur in prolonged sepsis from the long standing destruction of the blood or the toxic effect upon the bone marrow. Under such circumstances, it is very difficult to determine whether the hyperplasia is primarily leukoblastic, erythroblastic or lymphoblastic. Clinically there is only 1 constant factor, the anemia.

T C Smith (South M J 22:752 (Aug) 1929) reports a case of leukemia with a variation of the white cell count between a moderate leukocytosis and a leukopenia with a constantly abnormally high percentage of lymphocytes. He emphasizes

with this case the absolute necessity of microscopic study of the bone marrow and other tissues of the body in order to accurately classify such cases

**LEUKOCYTES AND LEUKOCYTOSIS.**—Data of great interest and practical usefulness have accumulated in the last year or two on what may be called the normal fluctuations in the leukocyte count. Garrey, struck by the variations occurring in persons normal to all intents and purposes, finally determined that a "basal" count was possible for any individual by having the person in a recumbent position and at physical and mental rest for an hour. Under such conditions normals yield a count of between 5000 and 6000 cells. Any variation is thus a departure from the basal state. Inasmuch as leukocytosis is usually regarded as an index of infection, it is wise to recognize other reasons for leukocytoses of similar degrees. The idea that there is a digestive leukocytosis is widely held, but crucial experiments have shown that the largest meal will not cause the slightest increase in the basal leukocyte count. On the other hand, postural changes raise the count almost instantly and in proportion to the degree of muscular work. For instance, a quarter-mile race lasting less than a minute caused a rise to 35,000 (Editorial, *J A M A* 93 1652 (Nov 23) 1929).

E M Medlar (*Am J M Sc* 177. 72 (Jan) 1929) found a variation of 100 per cent in the total leukocyte count and a variation of as much as 30 per cent in the differential count in the course of even an hour. Apparently there is a normal rhythm

during the course of a day, varying slightly from individual to individual and influenced by various factors. The amount of variation caused by each one is difficult to state and when a number are operating, it can not be said that the effect will be the sum total of the individual factors. There are no differences between men and women. Menstruation has no effect.

The rapidity of increase of circulating leukocytes is said to be due to their liberation from capillaries previously unused and suddenly called into action.

Smears of exudates taken during operation are important sources of information to the surgeon as to the presence or absence of organisms, their number, etc., and help to decide whether or not drainage should be instituted and how much. Schoer (*Deutsche Ztschr f Chir* 210 250, 1928) has added another procedure of similar use. Undamaged cells do not take colloidal dyes such as congo-red or trypan-blue, whereas damaged cells are stained by such dyes. He stained the pus from the exudate in acute appendicitis and then counted the number of stained and unstained cells. The conflict of the cells against the infection is shown by damage to the cells. In acute appendicitis, the stained leukocytes seldom exceed 10 per cent. In more virulent infections, perforation, gangrene, etc., the number increases to 50 per cent or more. Of course, efforts to obtain a smear from a suitable place must be made.

**LIGHT THERAPY OR HELIOTHERAPY.**—**PHYSIOLOGICAL ACTION.**—E Browning (*Am Med* 35 730 (Nov) 1929) has contributed an interesting and instructive article on the bio-

logic effects of light The effects of solar radiations on animal tissue can be closely correlated with those which are produced in the plant kingdom Both take place through the medium of pigments which act as catalysts In the plant world, the pigment concerned is a porphyrin derivative of chlorophyll, in the animal kingdom, the pigments concerned are hematin, which is an iron porphyrin compound, and hematoporphyrin, which is iron free The mechanism by which these agents perform their work is primarily a chemical reaction Just as chlorophyll is deposited on the surface of the leaf under the action of light, so hematin is deposited in the cells of the surface layers of the skin At the same time, there is a dilatation of the arterioles The mechanism of the deposition of hematin is in the same way connected with the sympathetic nervous system If the nerve endings in the skin are paralyzed by ergotoxin, no pigmentation takes place

It has been suggested that the glands of internal secretion are also concerned in the process, particularly the adrenals Certain organic substances hematoporphyrin especially, have the power of sensitizing the skin to the effects of light, causing it to react intensely to injurious effects, and it is possible that adrenalin acts in this way Such an assumption would explain the excessive pigmentation found in cases of Addison's Disease, due to lesions of the adrenal glands

The energy absorbed by the blood is chiefly that derived from the comparatively long waves The effect of light upon the white corpuscles is that of a lymphocytosis due to rays shorter than 3300 Å U, and to the visible rays from orange to blue, which stimulate the leukocytes also Longer ultra-violet rays cause a diminution of the erythrocytes, and to some extent of the polymorphonuclear leukocytes The phagocytic activity of the blood is increased by the longer, and decreased by the shorter ultra-violet rays The blood platelets are increased by irradiation, especially after they have been reduced by a vitamin A deficient diet The shorter ultra-violet rays have a powerful germicidal action

H Haxthausen (Hospitaltid 71 1289 (Nov 29) 1928) finds that erythema after irradiation with ultra-violet rays, is gen-

erally accompanied by a dilatation of the small arteries The temperature of the skin rises especially in erythemas with brief latent periods In contrast to the mercury quartz light, the carbon arc light produces a heat erythema which indicates a very considerable increase in the circulation of blood in the skin

**UNTOWARD EFFECTS**—A G Levy (J Path and Bact 32 387 (July) 1929) draws the following conclusions on the effects of light, with especial concern to ultra-violet light, upon the non-sensitized tissue The ear of white mice was used for these experiments (1) The essential action of white light upon sensitized tissue and of ultra-violet light upon non-sensitized tissue appears to be identical (2) The series of prolonged exposures of the mouse's ear to light is an immediate complete stasis with subsequent necrosis (3) Less prolonged irradiation results in delayed stasis with subsequent necrosis (4) In no case is stasis conditioned by the formation of clots (5) The necrotic changes are a consequence of the cessation of circulation (6) Hypertrophy and infiltration of the epithelium are striking results of irradiation which is insufficient to produce general stasis The hypertrophy is definitely shown to result from a brief period of irradiation

**THERAPEUTICS**—Every chemical reaction in the body is started by radiant energy, says A Gottlieb (Arch Physical Therapy 10 110 (Mar) 1929) Whenever body energy is deficient heliotherapy finds its indications The value of *sun radiation* has been proved in rickets, osteomyelitis and in delayed union of fractures. It is beneficial in localized wounds, ulcerations due to circulatory or neurotrophic disturbances, and infected wounds Chronic osteomyelitis, chronic arthritis and syphilis refractory to treatment, are favorably influenced Proper effects are obtained only by proper dosage Treatment should be commenced with air baths daily for 5 minutes, increasing the time until tolerance for the temperature of the air is created Then the sun rays should be introduced, beginning with small doses and slowly increasing to the maximum of tolerance, which varies considerably

Light has found its usefulness in the



treatment of diseases of the skin A Rollier (*Strahlentherapie* 28 259, 1928) states that heliotherapy exerts a splendid effect on certain common skin diseases, as **acne**, **psoriasis** and **eczema**. He also points out its beneficial effect on certain **nervous diseases**, on **anemias** and on **rickets**

L M Pierra (*Rev franç de gynec et d'obst* 24 210 (Apr) 1929) reports on his experience with heliotherapy in 328 cases of various gynecological diseases Of 24 patients with **utero-ovarian hyperplasia**, 9 were cured and in 12 the condition was ameliorated, 5 of them eventually became pregnant Of 28 patients with **uterine congestion** (**retroflexion**, **subinvolution**), 21 improved considerably and 7 (with **retrodeviation**) were cured Seventeen of 19 patients with **tuberculosis of the genitalia**, were cured Fourteen of 22 patients with **chronic metritis** were considerably helped, and 174 of 248 patients with **chronic inflammation of the uterine adnexa**, were cured or greatly benefited

**LIVER.—IDIOPATHIC ABSCESS**—Three cases of liver abscess without evident cause are reported by F Langenskiöld (*Acta chir Scandinav* 62 399, 1927) The first patient, a woman of 58 years, had a liver abscess the size of a cherry, from which a pure culture of streptococci was obtained After primary healing, the wound reopened, and a great number of small cholesterol stones were discharged, although there was no evidence of cholangitis or stones in the gall-bladder The concretions were not considered as the cause but as secondary formations The second case was that of a man aged 57 years, who had an abscess containing streptococci opened by the transpleural route When the wound in the liver was subsequently enlarged by a Paquelin cautery, air embolism with hemiplegia occurred, resulting in death 8 days later At the autopsy, 2 additional abscesses

were found in the liver, and also 2 septic infarcts in the left lung The third patient, a man of 26, had an abscess containing offensive pus Recovery occurred after a 2-stage operation Eighteen additional cases of so-called idiopathic abscess, selected from the literature, are considered The possible routes of infection are the portal vein and the hepatic artery. Clinically, idiopathic liver abscesses usually have the character of a secondary disease, following primary acute symptoms without evidence of localization While the author has used test punctures without untoward effect, he recommends extensive exposure of the liver as the only routine method by which multiple foci can be detected He believes the liver should be separated bluntly, that the Paquelin cautery is practically useless, and that diathermy is of slight value To prevent air emboli, increased intrathoracic pressure should be maintained while the liver substance is being divided

An occurrence of abscess of the liver after a panaritium is reported by A Troell (*Acta chir Scandinav* 62 342, 1927) A man of 22, after having a whitlow for 3 weeks, developed symptoms of abscess of the liver which was opened and drained, with recovery.

**AMEBIC ABSCESS.—COMPLICATIONS**—G Scuderi (*Riforma med* 44 683 (June 4) 1928) reports a rupture of an amebic abscess into the pleura and pericardium, and F Bezançon and E Bernard (*Bull et mém Soc méd d hôp de Paris* 51 1728 (Jan 5) 1928) rupture of an amebic abscess of the liver into the bronchus with recovery under treatment by emetin.

**DIAGNOSIS**—By the injection of sodium iodide into a thoracic fistula, W H Ude (Am. J Roentgenol 20 527 (Dec ) 1928) was able to demonstrate an amebic abscess of the liver

H Costantini (Arch med-chir de l'app respir 2 519, 1927) refers to the difficulty of diagnosing an amebic abscess of the liver when it is located on the posterosuperior surface. A large percentage of such unrecognized abscesses rupture through the diaphragm and adherent pleura into the lung and finally into a bronchus. If adhesions have not formed, the rupture may take place in the pleural cavity. The finding of chocolate-colored pus containing amebæ in the sputum or vomitus after a preceding history of dysentery is suggestive. However, in some cases the vomiting is intermittent, and yellow, nummular sputum is expectorated, and bubbling rales, characteristic of a cavity, are noted at the base of the thorax. There may be difficulty in diagnosing the condition from pulmonary tuberculosis. By x-rays, exploratory puncture, and emetin treatment, diagnosis is often possible.

**TREATMENT**—Emetin and stovarsol are usually effective. If the general condition of the patient is poor and the accumulation of pus is large, rib resection with drainage of the abscess under local anesthesia is desirable. The treatment by emetin and stovarsol, in any case, should be continued for some time.

**CYSTS**—An unusual *cystadenoma* of the liver, containing about a liter (quart) of chocolate-colored fluid, is reported by R Faltin (Acta chirurg. Scandinav 64·375, 1928). A woman, aged 44 years, accidentally discovered an indolent tumor of the upper right

abdomen, which was enucleated and hemostasis accomplished by suturing the walls of the wound cavity together. Healing and recovery occurred after about 2 months. The lining of the cyst was covered by a single layer of epithelial cells resembling those of the biliary ducts.

Two other successful cases of operations for solitary non-parasitic cysts of the liver are reported by A V Stoesser and O H Wangensteen (Am J Dis Child 38 241 (Aug ) 1929). While allied to cystic disease, the etiology is obscure. They occur chiefly in females and rarely give rise to symptoms other than those of pressure. Only once has a correct preoperative diagnosis been made. The presence in the liver of a large solitary cyst may be recognized by the fact that such swellings in the right lobe of the liver push the ascending colon, hepatic flexure, and transverse colon downward and to the left. The treatment of election is removal, although excision of a part of the wall of the cyst and marsupialization and drainage is a satisfactory mode of treatment.

**SYMPTOMS**—Pain is not considered an important symptom of uncomplicated *hydatid* cyst of the liver, although A Balduzzi (Policlínico (sez prat ) 35 129 (Jan 30) 1928) found severe pain in the right hypochondrium that radiated in front to the epigastrium and behind to the shoulder and angle of the right scapula, and sometimes was felt along the right side of the vertebral column behind and the groin in front. Three cases are reported in which pain was predominant and had persisted for years. One patient passed fluid and daughter cysts with the feces and recovered. In a second, pus and daugh-

ter cysts were evacuated by operation, and the third case was diagnosed by the position and hardness of a palpable tumor which was found on operation to be calcified. It is noteworthy that all of these patients had complications which evidently were responsible for the pain.

**COMPLICATIONS**—In 170 cases of *hydatid cysts* of the liver observed in the Sadiki Hospital by R. G. Brun (Bull et mém Soc nat, de chir 54 1014 (July 14) 1928) there were 27 cases complicated by communication between the cysts and the biliary tract. In 15 there was no biliary function. The cysts contained bile, and as a result of the communication they suppurated and sometimes contained air. For these the treatment should be directed to the cyst. In 8 the cyst opened into the gall-bladder, cystitis being produced which should be drained directly or through the cyst if the opening is large. As the cystic duct is usually obstructed, drainage of the gall-bladder is of no avail if there is icterus due to obstruction of the common duct. In 4 there was migration of bladder cysts into the bile duct with obstruction. In 2 of these the treatment was directed to the cyst and the gall-bladder with poor results. In 2 the common duct was attacked primarily and the cysts secondarily, and both patients recovered. Therefore, the author concludes that whenever there is icterus the common duct should be operated upon first.

**DIAGNOSIS**—The diagnosis of polycystic disease of the liver is considered by N. Fiessinger and R. Cattani (Bull et mém Soc med d hôp de Paris 52 1209 (July 19) 1928). In the differentiation from

hydatid cyst of the liver, the multiplicity of the cysts, eosinophilia, and a positive Casan reaction are important. Functional tests should also be considered, but operative inspection with biopsy, of course, determines the diagnosis. Hydatid cyst of the liver occurs in about 70 per cent of the cases and a simple univesicular or multivesicular cyst, with or without daughter cysts, may be present. These cysts may be complicated by suppuration and may rupture into biliary channels, the chest, or the abdomen.

Tanasesco (Bull et mém Soc nat. de chir 54 616 (May 5) 1928) reports the case of a patient who has had an epigastric pain, nausea, and vomiting for 5 years, and after a period of relief entered the hospital on account of obstinate constipation and a large mass in the right hypochondrium. The x-ray examination showed the tumor was in contact with the duodenum, and after improvement under an intravenous administration of urotropin and a milk and vegetable diet the patient was discharged. Two months later, he returned with typical symptoms of obstructive cholelithiasis, found at operation to be due to a hydatid cyst the size of a hazelnut in the common duct. The mother cyst was not found. Later, an area of dulness in the posterior axillary line led to the drainage of a cyst, with prompt recovery.

**TREATMENT**—H. Cosstantini discusses (Presse méd 36 1217 (Sept 26) 1928) the advantages of drainage of the biliary tract as recommended by the French school and of incision and evacuation of the cyst as recommended by the South American school,

preferring incision of the cyst to choledochotomy, because it permits not only the evacuation of the contents of the cyst but also the relief of stasis of the biliary tract. Regardless of whether incision of the cyst or choledochotomy is first practiced, a complementary intervention may be performed on the biliary ducts after incision of the cyst and on the cyst itself after the choledochotomy. As a rule, however, this second stage is unnecessary.

An x-ray examination to detect distortion of the diaphragm should be made in every case as in about 60 per cent of the cases, according to H. Dew (Surg., Gynec and Obst 48:239 (Feb.) 1929) multiple cysts are present. **Operation** for hydatid cysts is best performed under general anesthesia with adequate exposure. It is done in non-urgent cases in 2 stages. In the first stage the cyst and the pleural or peritoneal tissues should be painted with 5 per cent iodine and a tamponade of gauze introduced and incision and evacuation carried out 2 weeks later. The edges of the skin wound, and the stomach and intestines must be carefully walled off with gauze to prevent contamination and secondary implantation. The cyst can be evacuated easily by means of a 2-way needle and syringed with the introduction of pure formalin without removal of the needle. The formalin should then be withdrawn and the cyst filled with normal saline solution and closed. Multiple cysts or infected cysts must be incised, evacuated thoroughly, and swabbed with 4 per cent formalin or 90 per cent alcohol before closure. No attempt should be made to remove the thick fibrous adventitia com-

pletely. Closure of the cyst may be partial or complete, depending on the presence or absence of complications. All complicated cysts should be drained by a large rubber tube. The *complement-fixation test of Fairley* is valuable in the detection of residual cysts and in the prognosis. In simple uncomplicated cysts the results are very satisfactory. In suppuration, the mortality is about 20 per cent, and in cases of intrapleural or intravesicle rupture, 50 per cent.

**TUMORS.—CARCINOMA**—Primary carcinoma of the liver, in a child aged 9, is reported by E. J. Kilfoy and M. C. Terry (Surg., Gynec and Obst 48:751 (June) 1929). A common accompaniment of carcinoma, cirrhosis, was present in this case, and its prenatal occurrence is suggested by the clinical history. A summary of 43 reported cases is also given.

An enormous polycystic tumor of a child of 7 is reported by H. Grenet and P. Mathieu (Bull. Soc. de pédiat. de Paris, 25:485 (Dec.) 1927, Paris Med (Feb. 25) 1928).

E. S. Hick's patient had carcinoma the size of an orange, originating from the left side of the liver, associated with a band of cirrhosis, 2 inches wide (Canad. M. A. J. 20:169 (Feb.) 1929). The growth was excised and the cut surface of the liver sutured by an interlocking double catgut suture. Three or 4 vessels also required separate ligation. A rubber glove was spread out over the raw surface for tamponade and drainage. The drains were removed on the fourth day. Death occurred 6 months after the operation.

**COMPLICATIONS**—In Elliott's case (A. Am. Phys. (Jan. 29) 1929),

there was a persistent, progressive *hypoglycemia*. The fasting blood sugar was 14 mg, and the patient, when deprived of food, passed into coma not relieved by the administration of 570 Gm (19 ounces) of glucose every hour. The mentality was normal between attacks. In 50 c c of blood no evidence of insulin was found. An entire lobe of the liver was occupied by an adenocarcinoma with numerous metastases in the lungs and mediastinum. The pancreas appeared to be normal, the hypoglycemia being due to the sugar-imbalance function of the liver. Decrease of the liver substance was important, but functional degeneration of the remaining part of the liver was the chief factor. There is also a functional deficiency associated with the inadequate glycogen storage.

Two cases are reported by Wilder of extreme hypoglycemia without tumor of the pancreas. Part of the pancreas was removed, in one case with, in the other without, improvement.

**CYSTADENOMA** of the liver is considered by G I Gasparian (Arch f klin Chir 153 435, 1928) who reviews 97 cases, including 3 treated in Federov's clinic. Rejecting the solitary form, he admits only the diffuse type and says that radical operation alone prevents the formation of fistula. Etiology is believed to be a dysontogenetic factor, to which, for an unknown reason, a neoplastic process is added. It is more common in women, especially between the ages of 40 and 60 years. The clinical picture is indefinite, variable, and not typical, and the tumor is usually first recognized at operation.

E P Lasnier and C M Rodriguez Estevan (An de Fac de med Monte-

video 14 142 (Feb) 1929) report 2 cases of cystadenoma of the liver. The signs are large single, fluctuating and painless tumor of the liver. Eosinophilia, the intradermal reaction of Cassoni and Weinberg's reaction were absent, however.

**LIVER, FUNCTIONS OF.**—Within recent years great advances have been made in our knowledge of the physiology of the liver. Likewise many clinical tests for hepatic function in disease have been introduced. Unfortunately not one of them is of sufficient delicacy to be regarded as critically important in the investigation of hepatic disease. There are many reasons for the apparent inability to obtain evidence of liver insufficiency in the early stages of diffuse hepatic injury and in disease localized to one part of the organ. The known functions of the liver are legion. Marked disturbance of one function may exist without any appreciable degree of incapacity of other functions. Even in far advanced disease of the liver it has often been found necessary to utilize several tests before obtaining confirmation of the existence of disturbed physiology. A thorough understanding of hepatic physiology is essential to a proper selection of the more appropriate tests in a suspected case of liver disease.

Secondly, only a small part of the liver is necessary to carry on perfect function. The tremendous reserve of the liver has been well shown by the work of Mann and his co-workers and by many others. The experienced clinician has seen examples of this kind frequently. A third reason for the frequent failure of tests for

hepatic insufficiency is the rapidity with which regeneration follows removal or disease of the liver. F. C. Fishback (Arch. Path. 7: 955 (June) 1929) obtained almost complete restoration within 6 to 8 weeks after from one-fifth to three-fourths of the liver in the experimental animal was removed. This restoration takes place within the remaining lobes and not in the pedicle itself. New lobules were formed so similar in shape and size that they could not be distinguished from the old ones. The process has been called a compensatory hyperplasia rather than regeneration. An analogy to the embryonic development of the liver is present. Fishback stated that the liver seemed to possess an infinite capacity for regeneration.

There is much evidence accumulating to establish a close correlation of hepatic function with the functions of many other organs. G. Montemartini (Polichinico (sez. chir.) 36: 70 (Feb.) 1929) has recently attempted to establish such a relationship between the liver and spleen. The first few months following splenectomy performed on dogs and rabbits he found a marked disturbance of protein and carbohydrate metabolism. He reported an increase in total blood nitrogen with a decrease in the amino acid nitrogen and an increase of the azoturic coefficient. The glycogen content of the liver increased and an alimentary hyperglycemia developed. Serum bilirubin remained unchanged. The healthy spleen exerts a regulatory action on various hepatic functions, according to this investigator. He emphasized the need for the study of hepatic function before splenectomy is undertaken, feeling that a

marked alteration in nitrogen and carbohydrate metabolism contraindicated splenectomy. The logic of his argument is not clear. If hepatic function is so dependent upon normal splenic function, the diseased spleen might easily be responsible for hepatic insufficiency. Its inability to exert a normal influence on liver function might conceivably be considered another indication for its removal. Certainly the changes recorded by Montemartini have not been noted after splenectomy in Banti's disease, hemolytic icterus and other advanced splenic diseases for which this operation is performed.

**BILIARY FUNCTION.**—Recent experiments on the dog by Mann and his assistants indicate an extrahepatic site of origin of *bilirubin*. In that animal the chief site of formation of bile pigment is in the bone marrow. Bilirubin is formed in the cells of the reticulo-endothelial system in man in hemolytic icterus, the liver playing a minor role if any, in its manufacture. Experimental data pointing toward the polygonal cell of the liver as a possible locus for the formation of bile pigment is lacking. We have no knowledge of the importance of the normal Kupffer cell of the liver in bilirubin manufacture. One of the strongest arguments favoring the accepted site of origin of bilirubin outside the liver is the lack of evidence of a deficiency of bilirubin manufacture in advanced chronic progressive hepatic disease like portal cirrhosis. One of the first symptoms in certain types of liver disease is *hyperbilirubinemia*. The quantitative *Van den Bergh test* with Ehrlich's aldehyd reagent has gradually been adopted as the most valuable measure of the quan-

tity of bilirubin in the blood serum. This reaction is specific for bile pigment. The *test of Meulengracht*, popularized in this country by Bernheim, has likewise been adopted widely as a measure of the bilirubin content of blood serum. The *icterus index* is carried out by making a colorimetric comparison between blood serum and a 1:10,000 solution of potassium dichromate. Although not of great practical importance, erroneous readings may occur with the so-called icterus index test because of the presence of pigment, other than bilirubin, in the serum.

A rare condition known as *carotinaemia* or more properly xanthemia or "xanthosis of von Noorden" may give rise to a very high icterus index as well as discoloration of the skin (pseudoicterus of Moro). The latter is rather characteristic, being confined largely to the palms, plantar surfaces of the feet and nasolabial folds, but sparing the sclera. It results from ingestion of foods rich in yellow lipochrome pigments (carotin and xanthophyll), such as fruits, vegetables, butter and eggs. Xanthemia has been frequently observed in diabetics. W. C. Boeck and W. M. Yater (J. Lab. and Clin. Med. 14: 1129 (Sept.) 1929) have recently contributed an excellent summary of this subject. They describe a simple quantitative method for determining the amount of lipochrome pigments in the blood plasma, a *lipochrome index*. By comparison with the icterus index, they found the lipochrome pigments contributing from 10 to 50 per cent. of the color of the blood plasma in a large series of patients. They conclude, "The yellow color of the skin in xanthosis may lead to confusion in

diagnosis through its being mistaken for icterus. The distribution of the pigment in xanthosis is characteristic. A knowledge of the patient's diet may be helpful in explaining the pigment, and determination of the lipochrome index, icterus-index and serum-bilirubin permits of a conclusive diagnosis. When yellow pigmentation of the skin is present and the serum-bilirubin is low and the icterus-index high, the condition must be xanthosis; if the serum-bilirubin is high and the lipochrome-index low, the abnormal coloration is due to jaundice, if both the serum-bilirubin and lipochrome-index are elevated, xanthosis is present, but is obscured by jaundice."

Since the liver cell is undoubtedly the seat of manufacture of bile acids, clinicians have been awaiting a satisfactory method for determining their presence and amount in the blood stream. M. Aldrich (Aldrich and Bledsoe: J. Biol. Chem. 77: 519 (May) 1928) has succeeded in applying a quantitative *Pettenkofer test* to the determination of bile acids in the blood. It was thought that quantitative bile acid determination in the blood might clear up certain phases of liver function and be of value clinically in the differentiation of various types of icterus and possibly clarify the subject of dissociated jaundice. From this viewpoint, the results of the application of this test have been disappointing to C. H. Greene (Personal Communication (Mar.) 1930). The method is difficult to carry out clinically. L. G. Rowntree, C. H. Greene and M. Aldrich (J. Clin. Investigation 4: 545 (Oct.) 1927) encountered high *Pettenkofer* values frequently in hepatic disease, more commonly in jaundice and in the earlier rather than the

later stages of obstructive icterus. In cirrhosis of the liver high values were present in the absence of jaundice. No constant relationship was found between Pettenkofer values and pruritus, bradycardia or decreased coagulability of the blood in cases of icterus.

### CARBOHYDRATE FUNCTION.

—The liver derives its glycogen supply in large part from glucose brought from the intestines by the portal vein and to a lesser extent from the cleavage of protein molecules. Glycogen is converted back to glucose by an enzyme glycogenase, when glucose is needed for combustion. *Hypoglycemia* develops quickly following total hepatectomy (F. C. Mann and T. B. Magath, Arch. Int. Med. 30: 73 (July) 1922). The regulation of the blood sugar level is an important function of the liver. However, hypoglycemia is by no means the rule even in advanced liver dysfunction and it is often present in the absence of liver disease. F. A. Collier and F. L. Troast (Ann. Surg. 90: 781 (Oct.) 1929) claim that fasting hypoglycemia in a patient with glycosuria and a diabetic type of dextrose tolerance curve suggests an abnormal liver rather than diabetes.

The liver's ability to mobilize glycogen is shown by the development of transient *hyperglycemia* following general anesthesia, asphyxia or the injection of epinephrin. The presence of the liver is essential to this function. Glycogen storage is subject to wide fluctuations. That the development of hyperglycemia after epinephrin injection is dependent upon an adequate supply of glycogen in the liver has been shown by J. Markowitz (Am. J. Physiol. 74: 22

(Sept.) 1925), J. M. D. Olmstead and H. S. Coulthard (*ibid.* 83: 513 (Jan.) 1928), and S. Brill and T. Fitz-Hugh, Jr. (Arch. Path. 5: 1148 (June) 1928).

L. G. Barok and T. Rednik (Med. Klin. 24: 1202 (Aug. 3) 1928) utilize *adrenalin* as a test for hepatic function. After withdrawing a fasting sample of blood they inject 0.5 c.c. (8 minims) of a 1:1000 solution of adrenalin chloride and remove samples of blood every 30 minutes for 2 hours. Normally hyperglycemia should follow the injection. They found the test of value in the differentiation of icterus due to parenchymatous disease of the liver from mechanical jaundice. A normal hyperglycemic reaction occurred in obstructive icterus and only a very slight rise in blood sugar occurred in hepatitis. They attributed the negative reaction in the latter condition to a lowered glycogen content of the liver. S. Brill (Arch. Surg. 18: 1803 (Apr.) 1929) obtained the same effect in advanced disease of the liver but found the test to be of no value in earlier cases.

E. Forsgren (Hygiea 91: 369 (May 31) 1929) describes a rhythmic function of the liver. Glycogen storage occurs during the so-called assimilatory phase and the formation of biliary constituents in the secretory phase. Glycogen disappears from the liver during the secretory process in spite of an abundant nutritive supply and without relation to muscular effort. He states that insulin does not effect the glycogen content of the liver, but the glycogen content may have a bearing on the variable susceptibility to insulin in man and animals.

R. Siegel (Klin. Wchnschr. 8: 1069 (June 4) 1929) induced glycogeno-



lysis in white mice by the action of a thyroid hormone on hepatic cells. He found that the secretion of the pancreas hinders this phenomenon. He concluded that alimentary hyperglycemia and glycosuria may be explained by a deficiency of insulin. Endogenous diabetes, however, was attributed to an increased diastatic activity of the liver, which is caused by a secretion of the thyroid. He concluded that the peculiarities of juvenile diabetes might be due to overactivity of the thyroid.

O. Bang (Acta med Scandinav Suppl 29 9, 1929) reports an interesting relationship between carbohydrate metabolism and the urobilin function of the liver. He used the *modification of Schlesinger's test* described by Marcussen and Hausen in testing for urobilin. One gram (15 grains) of powdered zinc acetate is dissolved in 10 c c ( $2\frac{1}{2}$  drams) of 96 per cent alcohol, 10 c c ( $2\frac{1}{2}$  drams) of weakly acidified urine is added and 1 to 2 drops of 5 per cent tincture of iodine. The mixture is shaken and filtered. Maximum fluorescence occurs after 20 to 30 minutes if urobilin is present. An accurate quantitative estimation is possible by varying the dilution and using standard illumination. The test is more delicate but more complicated than Ehrlich's aldehyd test. He was able to produce pathological urobilinuria by (1) an artificially induced alkalosis following bicarbonate medication and (2) a carbohydrate-poor or a carbohydrate-free diet, for example in the treatment of peptic ulcer, hunger states or depressed mental states. Pathological urobilinuria occurred in diabetics in whom sugar metabolism was at all seriously upset. It did not

occur in untreated diabetics. The utilization of 60 grams (2 ounces) of sugar *per diem* is the approximate figure below which pathological urobilinuria is apt to occur. This contribution of Bang is another argument against a minimum carbohydrate diet in diabetes.

A. S. Minot (Proc Soc Exper Biol and Med, vol 24, 1927) found that animals subsisting on a low carbohydrate diet are more susceptible to the poisonous effect of carbon tetrachloride. Gastro-intestinal symptoms and tetany-like convulsions occurred. At autopsy severe central necrosis was found. Animals on a high carbohydrate diet were more resistant to the drug. After the symptoms appeared in the susceptible animal, a cure was often effected by the intravenous administration of calcium chloride. Poisoning by guanidine compounds and chloroform inhalations was found to be quite similar to that produced by carbon tetrachloride, by A. S. Minot and J. T. Cutter (Proc Soc Exper. Biol and Med 26 607 (Apr) 1929). The guanidine content of the blood was increased in all 3 types of poisoning, and similar symptoms developed at identical blood guanidine levels. There was an associated hypoglycemia, but glucose did not prove very successful in treatment. Calcium, however, raised and maintained the blood sugar level. Calcium with glucose brought about remarkable cures in animals and some success was recorded in a few clinical cases of marked liver injury. They consider the administration of calcium and glucose a valuable addition to the management of eclampsia and pre-eclamptic toxemia.

In the preparation of the patient for operation with chronic obstructive jaundice, I S Ravdin (J A M A 93 1193 (Oct 19) 1929) is of the opinion that the use of calcium is not responsible for the lessening of the tendency to bleed. He feels that the infrequency of post-operative hemorrhages is rather due to the common custom of giving glucose with the calcium as a pre-operative measure. He has demonstrated a marked reduction in the coagulation time of the blood of the jaundiced and normal patient and dog after the intravenous administration of dextrose. Ravdin found only a little more than one-fourth the amount of glycogen in the animal with obstructive jaundice of from 2 to 6 weeks' duration as compared with the normal liver. Liver cell injury from chronic obstruction of the common bile duct was not as great when the animal was on a high carbohydrate diet. After the obstruction is removed he feels that cell regeneration occurs and hepatic functions are resumed much earlier if the patient is receiving large amounts of carbohydrates.

Many of the contributions quoted above serve to further emphasize the importance of a sufficient glycogen reserve to normal liver function. An exhausted glycogen supply not only exposes the individual to the toxic action of many drugs which could be tolerated otherwise, but it probably impairs many of the important functions of the liver. The appearance of pathological urobilinuria in diabetes on a low carbohydrate intake, and the increase in the coagulability of the blood in jaundice patients by building up a glycogen reserve, are important additions to our knowledge. The

necessity for keeping up an adequate carbohydrate intake in liver disease generally becomes more obvious. Of equal importance is the necessity for avoiding anesthesia and drugs which are toxic to the liver in the presence of liver cell damage. When glycogen insufficiency of the liver is present and particularly in contemplated operations on patients with hepatic disease, the use of glucose and of calcium seems of paramount importance.

A *lactic acid tolerance test* for liver function has been attracting attention abroad. K Beckmann (Ztschr f klin Med 110 163 (Mar 12) 1929) carries it out as follows. A fasting blood sample is removed after half an hour's rest. Twenty c c ( $\frac{2}{3}$  ounce) of two-thirds normal sodium lactate solution (corresponding to 0.36 grams— $5\frac{1}{2}$  grains—of lactic acid) is injected during a period of 1 minute. Specimens of blood are withdrawn 5 and 15 minutes later and the lactic acid content determined by the Mendel and Goldscheider colorimetric method. Almost immediate withdrawal of lactic acid from the blood occurs if normal liver function is present. The author claims a definite relationship between the resynthesis of lactic acid and the degree of impairment of liver function. He found it of particular value in the differentiation between obstructive jaundice and icterus due to liver disease. Its value would seem to be analogous to that claimed for the fructose and galactose tests. Beckmann found the test positive before the galactose, urobilin or dye excretion tests gave any evidence of liver dysfunction. H Schumacher (Klin Wchnschr 7 1733 (Sept 9) 1928) is not so enthusiastic. He reported ab-

normal retention of lactic acid in severe forms of liver injury but obtained normal results in the earlier stages of liver disease. A few normal people with markedly weakened muscles gave positive reactions. More information concerning the destruction of exogenous lactic acid must be at hand and a wider clinical experience will be necessary before the value of the test can be ascertained.

The situation with regard to the value of the *galactose* and *levulose* (*fructose*) tests for hepatic function remains the same. Our European colleagues continue to emphasize the significance of these 2 tests as methods of differentiation between mechanical icterus and jaundice due to liver cell disease. In this country most investigators are skeptical of their value. These 2 tests are worthy of more thorough study and trial.

**DYE RETENTION TESTS**—The ability of the liver to remove from the circulation certain dyes which are injected has been utilized in testing liver insufficiency. *Phenoltetrachlorophthalein* and *bromsulphthalein* have been widely adopted as tests for liver function. A unison of opinion exists with regard to their value. There is no need to quote many recent reports on this account. Dye retention will be found in all types of jaundice except the hemolytic variety. Very high values are obtained in obstructive jaundice. Likewise in catarrhal and in toxic jaundice marked dye retention will be present. The persistence of high retention level after subsidence of the icterus indicates residual liver cell injury. High values exist in portal cirrhosis independently of jaundice or ascites and without relationship to the size of the liver with few

exceptions. Dye retention is higher in cases with ascites and still higher if jaundice is present. Dye retention is disproportionately higher than the blood serum bilirubin level in biliary cirrhosis. The dye tests are frequently negative in carcinoma of the liver until jaundice supervenes. Positive results are obtained in some cases of cardiac decomposition with hepatic enlargement. Abnormal dye retention is frequent in secondary syphilis during and shortly after the eruptive stage. In untreated tertiary lues, dye retention may supply the first suspicion of hepatic involvement. The majority of P. A. O'Leary's cases (O'Leary, Greene and Rowntree Arch Int Med 44 155 (Aug) 1929) of gumma of the liver showed slight degrees of retention of dye. This has not been the experience of others. A positive dye test is often obtained during a course of arsenical therapy as the earliest indication of liver cell injury. I. A. Siegel (Am J Obst and Gynec 14 300 (Sept.) 1927) considers the *bromsulphthalein* test of value in pregnancy in differentiating nephritis from pre-eclamptic and eclamptic toxemia. In eclampsia he thought it might be useful in prognosis. S. Berman (Am J Obst and Gynec 16 410 (Sept.) 1928) reports a different experience with *tetrachlor* in the toxemia of pregnancy. He obtained variable results and decided the test was of no practical value in the management of cases of toxemia of pregnancy.

**LUMBAGO.—ETIOLOGY.**—Lumbago and ischialgia should be considered as occupational diseases of laborers, according to Vainstein (Medit Obosrenie 7:38 (Mar-Apr)

1928). Predisposing causes are frequent attacks of malaria, alcoholism and exposure to damp and cold. Trauma may be the sole or contributing cause. A slow course is characteristic.

According to J. Ulrich (Ugeskrift for Laeger 89 1041 (Nov. 17) 1927), *traumatic* lumbago is rare, while *rheumatic* lumbago is far more common, and sometimes there is a combination of both. He advises using the muscles as much as possible in *rheumatic* lumbago, while in the *traumatic* type, rest is advisable. If recovery does not follow 6 or 8 days' treatment, x-rays and further studies should be made.

*Traumatic* lumbago is reported by G. Jeanneney (Gazette hebdomadaire de Bordeaux 49 304 (May 13) 1928) in the case of a man having all the lumbar transverse processes on the right side, and the third and fourth lumbar process on the left side fractured in a fall with no signs of contusion in the lumbar region. The author believes that even marked lateral displacement of the fragment is of less consequence than vertical displacement, in which the spinal nerves may be compressed and cause primary symptoms, or may become included in the callus and cause secondary symptoms. The condition should be considered in all cases in which there is a contracture of the sacrolumbar mass of muscles, with pain at the level of the transverse process. The treatment usually consists in the application of a plaster-of-paris cast. In cases in which compression of one or more nerve roots is present, surgical removal of the offending fragments is indicated.

The most frequent cause of lum-

bago is strain, according to S. Erben (Wiener klinische Wochenschrift 41 156 (Feb. 2) 1928). The disease involves one or more joints and may extend to the sacro-iliac articulation. This region is then painful on pressure, and thickenings are frequently found outside the muscle substance, which can be verified in the radiograph. The most effective treatment is rest in bed for from 8 to 14 days in a well warmed room and with cutaneous counter-irritation. The author uses some suitable ointment or an alcoholic fomentation (linimentum capsicae or mustard plaster) placed over the lumbar region with some source of heat over it for 2 or 3 hours every day for about 2 weeks. Warm full baths are to be avoided. A flannel binder should be worn during the attack and for a month afterward. If the pain is not gone after 2 weeks, protein therapy is begun.

The differential diagnosis of *traumatic* and *rheumatic* lumbago is stated by J. Veyrassat and F. Ody (Revue médicale de la Suisse romande 49 313 (May 25) 1929) to be difficult in the early stages. Lumbago is a syndrome of various muscular, articular or bone lesions of traumatic or diabetic nature. The most important diagnostic points in favor of traumatic lumbago are unilateral and well localized pain that increases on certain movements and decreases, or completely disappears, during rest, absence of pain before the accident, presence of local edema and ecchymoses, disappearance of all symptoms within a week in cases of only muscular lesions, or the development of late traumatic arthritis or of homologous scoliosis in cases of articular or bone lesions.

If traumatism was absent or doubtful, the bilaterality and indistinct localization of the pain, which increases at night, and a more or less prolonged gradual development (and not a sudden occurrence after an accident) of the condition are in favor of the diathetic, usually rheumatic, nature of lumbago. Then one should also look for tuberculosis, syphilis, gonorrhea, influenza and other acute infections, hernia, diseases of the genitalia, hysteria and previous spinal anesthesia.

### LUNGS.—PHYSIOLOGY —

R Fontaine and L Herrmann (Arch. Surg. 16 1153 (June) 1928) undertook experiments to determine whether *post-operative massive atelectasis* is due to a disturbance of innervation. They state that there is considerable difference between the innervation of the lungs in man and various animals used for experimental purposes. In a series of 10 dogs, the denervation of one lung was followed by little change in the respiratory movements or the rate or volume of the pulse and, except during the first 2 days after the operation, there was no change in the carbon-dioxide combining power of the plasma. Section of the extrinsic nerves that lead to one lung does not prevent the occurrence of a typical massive atelectasis (collapse) of the lung. The authors conclude that, like the heart and the blood-vessels, the lungs have their own intrinsic nerve supply which is capable of functioning even when the extrinsic nerves are completely divided. This explains some of the failure to relieve asthma by operative procedures on the extrinsic nerves of the lungs.

C C Macklin (Physiol. Rev. 9 1

(Jan) 1929) discusses the physiology of the lungs. In this review the lung is considered as a muscular organ—a conception which opens up new avenues of approach to clinical problems in this field. The fundamental lung unit is thus similar to the lung of lower forms, such as the frog. Innervation, through vagus and sympathetic fibers, coordinates these movements, and it is suggested that there is a reciprocal or “antagonistic” action between the bronchial musculature and that of the chest wall and floor.

B M Fried (Arch. Path. 6 1008 (Dec) 1928) asserts that the loose connective tissue with which the lung abounds, particularly the mesenchymal cells (macrophages), plays a rôle in immunity, in infection, and in the metabolism of different substances, thus representing a defensive and metabolic apparatus of the organism. It is furthermore possible that mesenchymal tissues also possess properties of internal secretion. The lungs possess a highly developed mesenchymal, *i e*, a defensive and metabolic apparatus.

**DIFFERENTIAL DIAGNOSIS IN PULMONARY DISEASE.**—Ludwig Petschacher (Wien klin Wchnschr. 41 964 (July 5) 1928) calls attention to the fact that the most important among the erroneous diagnoses in pulmonary conditions, is the failure to recognize an existing tuberculosis. Gripe is often diagnosed, when pulmonary tuberculosis is present, the differential diagnosis between gripe and tuberculosis is difficult at times. Even the x-ray may occasionally fail as a diagnostic help.

Tuberculosis in patients is nowadays seldom diagnosed as “anemia” or “chlorosis,” but the presence of

heart disease in tuberculosis may offer diagnostic difficulties especially during the onset of hemophthisis, which might suggest stasis or infarct formation, also a simultaneous presence of a cirrhotic tuberculosis in the aged, is difficult to diagnose in the presence of heart disease. A tuberculous process is easily overlooked in a cancer patient. X-ray is often valuable in those cases where physical findings are negative.

The reverse is also true. A chronic pneumonia localized in an upper lobe, is often mistaken for tuberculosis, some cases of chronic sepsis, like lobular pneumonia with respiratory symptoms, may be mistaken for tuberculosis. A mitral stenosis with hemophthisis, pallor, and slight physical cardiac findings, may be mistaken for pulmonary phthisis. Bronchiectasis is also a source of error in the diagnosis of tuberculosis.

The beginning of a lymphogranulomatosis may simulate tuberculosis, when no changes are demonstrable in the peripheral lymph nodes, but the x-ray will indicate changes in the mediastinal glands.

In order to eliminate certain errors in auscultation of the apices and roots of the lungs, A. Winkler (*Deutsche med. Wchnschr.* 54: 866 (May 25) 1928) recommends deep and somewhat rapid breathing (40 to 60 respirations per minute). Inspiration and expiration must be of equal rapidity, and breathing should be performed through the half-open mouth. He states that in vesicular breathing inspiration is accented, while in bronchial breathing expiration is accented.

**X-RAY DIAGNOSIS**—In discussing the value of x-rays in the diagnosis of

pulmonary and pleural diseases, C. R. Austrian (*Am. J. M. Sc.* 175: 753 (June) 1927) states that no examination of the chest is complete without an x-ray picture, but the x-ray cannot take the place of a careful physical examination. No matter how important the data obtained by the aid of the x-ray may be, it cannot determine the etiology of the abnormalities disclosed, *i. e.*, it cannot state whether a clinical disease is present or not.

F. M. Pottenger (*ibid.* 175: 676 (May) 1928), in discussing certain factors that militate against the accurate correlation of physical and x-ray examinations of the chest, points out that the results of laboratory and mechanical investigation are rarely to be interpreted as making the diagnosis, but rather as strengthening or weakening the opinion gained by the careful examination of the patient.

The variation between the physical findings and the x-ray findings is due to (1) Certain well recognized sources of error in physical examination, and (2) certain errors inherent in the x-ray. On physical examination, there are no signs or sounds that can be interpreted as always indicating a definite pathologic lesion. Likewise, the character of the plate, the time of exposure, and the experience in reading shadows are all generally recognized as influencing the x-ray data. The inability of certain pathologic tissues to intercept rays, because the elements which enter into their composition are of low atomic number, is a distinct limitation to the use of chest plates, which cannot be overcome, when small lesions are suspected on physical examination, plates should be taken dorsoventrally and ventrodorsally.

S. Bonnamour and A. Badolle (Presse méd. 37 173 (Feb. 6) 1929) have been interested in the roentgenography of the normal lung after the injection of lipiodol and the diagnosis of small bronchial dilatations. These authors emphasize that to obtain correct roentgenograms, the technic must be strictly uniform. Only one side of the thorax should be injected at one operation. The amount of lipiodol injected should be 30 cc (1 ounce).

Roentgenography in the first quarter of an hour following the injections should show (1) almost complete absence of bronchial tracery below the hilum, and (2) fine and regular markings of the alveoli resembling the foliage of a tree.

A bronchus which remains full and hence visible in the roentgenogram, is diseased. The "dead tree" appearance indicates generalized dilatation. The localized absence of foliage markings indicates a dilated branch.

The significance of the so-called *ring shadows* in the lungs has been investigated by H. Laurell (Acta radiol 10 72, 1929). He finds that transient annular shadows correspond to tuberculous cavities. They are also produced by large interstitial, subpleural and interlobular emphysematous vesicles. At times an encapsulated pneumothorax might produce typical annular shadows.

**ABSCESS**—C. Eggers (Ann Surg 87 485 (Apr) 1928) makes a clinical division of the forms of pulmonary suppuration into *Group 1* Suppuration limited to, or originating in, the bronchial tree, *i e*, bronchiectasis. In these cases, the etiological factor is the aspiration of a foreign body. The inflammation may be unilobar or mul-

tilobar. It occurs most frequently in the lower lobes. Abscess formation within or outside of the bronchus may ensue. *Group 2* Suppuration of the lung parenchyma outside of the bronchial tree, *i e*, lung abscess. Lung abscess occurs most frequently in bronchopneumonia of streptococcal or staphylococcal origin and conditions in which pus-producing organisms are secondary invaders. It may be produced also by septic emboli carried to the lungs through the pulmonary circulation and by the secondary infection of an aseptic infarct. It is probably seldom due to pure pneumococcus infections. *Group 3* Massive gangrene of the lung. This condition is uncommon. The primary cause is the blocking of a blood-vessel by an embolus or thrombus. Acute intrapulmonary suppurations with marked sepsis, if untreated or treated only by medical measures, run a rapid fatal course. In milder cases a cure may result following absorption or evacuation through the bronchial tree. Eight cases of spontaneous cure are reported by Eggers. Empyema may occur from perforation of the pleural cavity. A sudden perforation may be favorable, as a sudden drainage of the empyema may result in cure. In chronic suppuration resulting in bronchiectasis or lung abscess, complications such as hemorrhage, pyopneumothorax, secondary pneumonia, or embolism may develop.

**ETIOLOGY**—The following causes of suppuration of the lung are given by Willy Meyer (Arch Otolaryng. 7 107 (Feb) 1928). (1) Traumatism, including the entrance of a foreign substance into the bronchial tree, (2) entrance of infecting microbes, (3)

chronic specific inflammations, as tuberculosis or syphilis; (4) ulcerating tumors, (5) rarely abscess, following suppurative hydatid of the lung, actinomycosis, etc. Aside from such acute inflammations as pneumonia, influenza and spirillum infection of the lung, aspiration of a foreign substance is the chief cause of suppuration. Embolism by an infected thrombus may be a causative factor.

The micro-organisms usually found in pulmonary abscesses are known under the general name of "*fusospirochetes*" and include *Vincent's spiriochetes*, *fusiform* and *pyogenic bacilli*, *diphtheroids*, and the *bacillus influenzae*. Much experimental work has been done in the production of pulmonary abscesses. By introducing pledgets of cotton saturated with fresh scrapings from pyorrhea cavities into the main lobe bronchus through a bronchoscope, Crowe and Scarff caused abscesses in 8 instances. These were confined to a single lobe, were not associated with a general pneumonitis and were characterized by necrosis and cavity formation. In 2 dogs, pulmonary abscesses resulted from a sinusitis produced by introducing cotton pledgets contaminated with pyorrhea scrapings into the frontal sinus of the dog. In 50 dogs, in which pledgets of cotton infected with cultures of pneumococci, staphylococci, streptococci, colon bacilli, and various other bacteria instead of pyorrhea scrapings were introduced into the main bronchus, the results were either negative or a diffuse pneumonitis developed. In the experiments of D S Allen (Arch Surg 16 179 (Jan-pt 2) 1928) pus obtained from chronic non-tuberculous

abscess of the lung was injected into the tracheæ of 15 rats, without effect. By using pus freshly expelled, he was able to cause minute multiple abscesses in 3 of 18 dogs. From ligation of the main bronchus and injection of purulent material into the lobe, multiple abscesses or pneumonia followed, while from simple ligation of the bronchus suppuration did not follow.

While he was able to produce pulmonary abscesses in dogs by liberation of septic emboli according to the technic of Cutler, Allen believes that aspiration is an important cause of pulmonary abscess, provided the infectious material is not allowed to escape from the lungs.

In supporting the embolic theory of production of *post-operative abscess* of the lung, E C Cutler (Edinburgh M J 35 213 (Nov) 1928) quotes Mikulicz, who first pointed out that pulmonary complications follow operations under local anesthesia about as frequently as they follow operations under general inhalation anesthesia, that they are more frequent in septic cases, that their incidence has not been reduced by the great improvement that has been made in the induction of general anesthesia, and that they occur most frequently in cases operated upon by surgeons whose technical care of the wound and hemostasis are faulty. Abscess of the lung is but 1 of the many clinical forms of post-operative sequelæ which may have a common etiology. Referring to unsuccessful experimental attempts to cause abscess of the lung by introducing bacteria and foreign bodies into the bronchi, when bacteria are brought into the lung in the form of emboli, abscess formation



frequently results. Bacteria entering the lung in the form of a free infected blood clot caused diffuse pneumonitis. From various experiments on dogs, the development of a diffuse pneumonitis, the rapidity of healing, and even lung abscess is determined by the immunity of the host and the virulence of the organism, and in man the chronicity of the abscess may be due to a secondary invasion by bacteria from the mouth. The evidence is believed to indicate that the embolism is due to surgical manipulations, and that a more gentle technic and perfect asepsis will do more to obviate the serious complications than improvement in anesthetic apparatus. The fact that many pulmonary complications develop much later after operation than would be the case if they were due to aspiration is also cited in favor of the embolic theory.

It is difficult to produce experimentally a chronic type of abscess comparable to the post-operative pulmonary abscess in man, but Herrmann and Cutler (Proc Soc Exper Biol and Med 26 28, 1928) found that arterial emboli infected with spirochetes, fusiform bacilli, and other micro-organisms from the mouth of the patient with pyorrhea, when implanted in the pulmonary tissue produced chronic abscesses identical in most respects with those of man. The abscesses were thick-walled, lined with a dark gray necrotic membrane, of a foul odor and contained exclusively anaerobic bacteria. The same organisms introduced by way of the bronchi did not give this result. Adams, van Allen and Day (Soc Exper Biol and Med 26 163, 1928) produced acute abscesses by

emboli with the *Staphylococcus aureus* which healed within 4 weeks, but if 10 days after the production of the embolic infection the lungs were infected with bronchiectatic sputum, which alone gave no abscesses, there resulted chronic abscesses. This raises the question as to whether post-operative lung abscesses from infected emboli may become superinoculated by organisms through accidental insufflation from the mouth and thereby assume the characteristics of bronchogenic abscesses.

The experiments of I. F. Weidlein and L. G. Herrmann (J A M A 91 850 (Sept 22) 1928) showed that pulmonary abscesses produced by freeing small artificial septic emboli in the venous circulation usually healed within 3 weeks unless a chronic cough was induced in the animal by irritating inhalations (free chlorine gas). More chronic abscesses followed the use of anaerobic organisms, but when introduced by the intratracheal route abscesses were produced only when the entire bronchus was occluded. In the experimental animal, insufflated material must block the air passages completely as well as injure the bronchi before an abscess is produced, and as the arsenicals which kill spirochetes will rarely cure pulmonary abscess in man, it is thought that the anaerobic organisms are probably secondary invaders. The bronchiectatic type of abscess begins in the bronchial tree and is the type that follows the inhalation of a foreign body or grossly contaminated material which becomes lodged and occludes the finer bronchi. This form responds readily to treatment when the foreign body or obstructing

material is removed and the cavity aspirated endoscopically

Lemon, after finding aspirated material in the abscesses and discovering that mucus and other substances are aspirated during the course of general anesthesia, believes that the infectious material enters from the nasopharyngeal passages. By lowering the head of the experimental animal below the level of the feet, aspiration was prevented in the anesthetized animal.

In a bronchoscopic study on 100 patients undergoing *tonsillectomy* under light general anesthesia, Myerson found that the abolition of the cough reflex is of great importance. In 22 cases, in which the cough reflex was not abolished, blood or mucus was found below the larynx in only 4, whereas in 78 cases in which the cough reflex was abolished, blood or mucus was found distal to the larynx in 72. Corper found that in dogs and rabbits placed in a horizontal position, aspiration of fluids introduced into the nose occurred readily only when anesthesia was induced.

From 77 intrabronchial injections of injected material, C. A. Hedblom, M. Joannides and S. Rosenthal (Ann Surg 88:823 (Nov.) 1928) produced pulmonary abscesses in 29.8 per cent. It was found that aspiratory abscesses can be produced in the dog if the cough reflex is controlled sufficiently long to allow the infected liquid to settle in the alveoli. Fresh blood mixed with sputum containing numerous fusospirochetes mixed with pyogenic organisms caused the greatest number of the abscesses. Pyogenic organisms mixed with blood did not cause abscesses, and a lower percentage of abscesses was produced by

the injection of gastric contents, pyorrhea scrapings, or combinations of these substances with small pieces of tonsil and teeth. In 1 instance, the abscess was not in communication with the bronchus.

J. Harkavy (Arch Int Med. 43:767 (June) 1929) also believes that while embolic abscesses may occur, they are exceptional, and aspiration appears to be the more probable mode of production of lung suppurations following operations upon the upper respiratory tract. Of 27 dogs receiving, through the bronchoscope, mixed cultures of bacteria recovered from the sputum of patients suffering with abscesses of the lungs following tonsillectomy, 3 developed abscesses with cavities, 1, pulmonary suppuration, and a fifth had a healed suppurative process in the lower left lobe. Aschner found bronchiectatic suppuration, extrabronchial abscess and suppurative pneumonitis in lungs examined 2 to 5 years after tonsillectomy. Harkavy suggests that the aspiration of infectious material from the upper respiratory tract may give rise to pneumonitis followed by necrosis and cavity formation, which may either heal or persist with the formation of a secondary bronchiectasis.

In considering the medical aspect, T. McCrae (Arch Otolaryng 7:103 (Feb.) 1928) states that the etiology of lung abscess is often clear, especially in cases of abscess due to a foreign body in a bronchus, or abscesses associated with bronchial neoplasm, pneumonia, or tuberculosis. In other instances, infarction may be recognized as the cause. In some cases, the etiology cannot be definitely

established, especially following operations on the upper air passages

Factors favoring the occurrence of abscess of the lung following operation are: (1) the presence of an unrecognized acute infection, (2) pulmonary tuberculosis, an acute lighting up of which may follow operation and (3) mechanical factors such as the aspiration of infective material because of the abolishment of the cough reflex

Before rupture, external drainage should be considered. If rupture has occurred, early bronchoscopic drainage offers the best chance of cure

In a review of 241 cases of pulmonary abscess, L. F. Morrison (California and West Med. 27 792 (Dec) 1927) at the San Francisco County Hospital and the University of California Hospital, in the period from 1913 to 1917, found that pulmonary abscess followed *tonsillectomy* once in 4800 cases. Symptoms began on the second, third or fourth day, and the abscess ruptured between the fifth and fourteenth day. After other operations, the symptoms begin with a septic temperature and often with pain in the chest on the third and fourth day. The abscess is formed much more frequently in the right lung than in the left lung. Treatment for the first 3 months may be medical, expectant and supportive. **Bronchoscopy** may be found of value. The condition may clear up under medical treatment or run a chronic course. The prognosis as regards complete cure is unfavorable. Morrison believes that the infection usually occurs by aspiration during *tonsillectomy* and by way of the blood stream after general surgical procedures. The lymph stream as a

route of infection is of minor importance. The experience of Myerson, who found blood in the trachea and bronchi in 77.5 per cent of the cases of *tonsillectomy*, is mentioned.

**DIAGNOSIS**—For the past decade, pulmonary abscess, bronchiectasis, and chronic pneumonia have been confused with pulmonary tuberculosis. P. H. Pierson (California and West Med. 27 511 (Oct) 1927) in a report of 30 cases of non-tuberculous pulmonary suppuration notes that pulmonary abscess due to aspiration of foreign material is usually characterized by gradual onset with fever, malaise and an unproductive cough. After a period of from 12 to 15 days chills and sweats occur, and the symptoms persist until the abscess ruptures. If the abscess is due to anaerobic bacteria, there is often a latent period of from 10 days to 12 days. Sudden onset, sharp pain in the chest, followed by fever and an unproductive cough, suggest embolism following operation. After a period of from 10 days to 2 weeks, the abscess usually ruptures. The development of a pulmonary abscess in bronchopneumonia is indicated by recurrence of a protracted fever after apparent subsidence of the infection. Here diagnostic needling should be avoided until there is visible evidence of adhesion between the viscera and parietal pleura. In 2 of the cases reviewed, an abscess occurred in the upper lobe after a fracture of the rib.

In the diagnosis a detailed history, a careful x-ray study, and repeated negative examination of the sputum for tubercle bacilli, in cases with considerable purulent expectoration, should suggest a pyogenic abscess rather than a tuberculous lesion. Physical

signs are often indefinite and meager as compared with those produced by a tuberculous lesion of like extent

**PROPHYLAXIS**—The following precautions used by Crowe and Scarff *before tonsillectomy* are considered important: (1) **Morphine** and **atropine** were given before the operation, (2) the **anesthesia** was induced by a **trained anesthetist**; (3) throughout the operation the patient's head was **kept** at least 15 inches lower than his feet; (4) the **swallowing reflex** was **maintained** during the period of anesthesia, (5) the **mucus and blood** were **removed** from the **pharynx** by careful suction; (6) all **bleeding vessels** were carefully ligated.

**TREATMENT**—Medical treatment consisted chiefly of **general supportive measures** with, in the acute abscess, **postural treatment**. If there is no improvement after 4 to 6 weeks of medical treatment, **operation** is advised. In the absence of adhesions between the pleuræ, the 2-stage **thoracotomy** offers the best result. In all cases where a foreign body is suspected or known to be present, **bronchoscopy** should be used. In chronic pneumonia and bronchiectasis an accurate diagnosis is essential for proper treatment. X-ray study after the administration of **lipiodol** is helpful in distinguishing bronchiectatic cavities and saccular dilatations from diffuse fibrosis. The patient should be prepared by **postural drainage** of the cavities for at least an hour prior to the administration of the **lipiodol**. The essentials of medical treatment include a **change of residence** to a **climate** that is **warm and dry**; local treatment by **postural drainage** and **diathermy**; attention to the general health, artificial and natural **sun**

**baths**; **rest** and a **high caloric diet**. **Autogenous vaccine** therapy has been found of great value for the relief of the *cough* and expectoration. **Surgical measures** are used to eradicate foci of infection. In unilateral conditions which do not improve under medical treatment, **drainage** of the large cavities and **Graham's cautery lobectomy** offer a hope of cure. **Extrapleural thoracoplasty** with **avulsion** of the **phrenic nerve** is a means of compressing the affected lung. In chronic pneumonia and bronchiectasis as well as pulmonary abscess, the induction of **pneumothorax** may be followed by **pyopneumothorax**.

Treatment, according to Eggers (*loc cit*), includes attention to the patient's general condition, with **rest**, a **high caloric diet**, and the treatment of any accompanying disease. In *spirochetal infections*, **salvarsan** injections are useful. In *bronchiectatic abscess*, **postural drainage**, repeated 3 or 4 times a day, is the method of choice. **Bronchoscopy** is usually done weekly for diagnostic or therapeutic purposes and sometimes results in a cure. In certain cases, especially where there is only a single abscess or involvement of only 1 lung, operation is indicated. Either **extrapleural thoracoplasty**, **phrenicotomy**, **cautery pneumectomy**, or **lobectomy** may be done. Lobectomy has a very high mortality. Lung abscess proper requires **drainage** through the bronchial tree or by operation. An operation should be avoided in the early stages of pulmonary suppuration but is indicated after 2 or 3 months if there is no improvement. The operation may be performed in 1 or several stages, depending upon the adhesions present. Accuracy in the localization of

the abscess should be insured by bronchoscopy, x-ray films and diagnostic needling. After surgical drainage, the course of the condition may be rapid or slow. A bronchial fistula may delay healing or act as a permanent safety valve. Of the 105 cases, 30 per cent were treated surgically with 10 deaths or a mortality of 30 per cent. Some of the deaths occurred soon after, and others a long time after, the operation. Of the 22 patients who recovered after the operation, 17 were cured and 5 were benefited. Four of the latter had a temporary or permanent bronchial fistula. Of the patients who were not operated upon, 16 died. Complicating conditions included brain embolism, myocarditis, and carcinoma. Of the remaining 57 patients, 21 were cured, 11 were benefited, 15 were not benefited, and 10 are still under treatment. While non-tuberculous intrapulmonary suppuration is compatible with life for many years, it is eventually fatal.

The intrathoracic injection of neosalvarsan is also commended by Hans Edel (*Medizin Klin* 25 668 (Apr 26) 1929). In *empyema*, puncture is made with an ordinary large caliber needle. After draining off the pus, neosalvarsan is injected into the pleural cavity through the same needle. As the pleural cavity can support large doses without reaction, the initial dose should be 0.45 Gm (7 grains) gradually increased to 0.6 Gm (10 grains) in 10 c c (2½ drams) of distilled water, at intervals of from 3 to 5 days, according to the patient's general condition and the condition of the empyema. In *gangrene*, the injection is made directly into the gangrenous mass. In *bronchitis*, the injection

should be made into the bronchial tree through a laryngeal catheter. The pharynx and larynx are thoroughly anesthetized by a 20 per cent. cocaine solution, with the patient lying on the affected side, and about 5 c c. (80 minims) of a 2 per cent solution of neosalvarsan used.

This is followed by a few c c of distilled water so as to deposit the whole dose intrabronchially. The dose is gradually increased to 0.6 Gm (10 grains) of neosalvarsan, the injections being given at intervals of from 4 to 6 days, according to the reaction. Neosalvarsan is also valuable in post-operative treatment of pneumotomies and resection of the rib in empyema. After the operation, the cavity is packed with gauze tampons saturated with neosalvarsan solution, or the drainage tube is packed in strips of neosalvarsan gauze.

The dose should be 0.3 to 0.6 Gm. (5 to 10 grains) neosalvarsan dissolved in 10 to 20 c c (2½ to 5 drams) distilled water, according to the size of the cavity. The advantages are: The rapid clearance of the florid inflammation of the pleura, the spontaneous total expulsion of the gangrenous particles, and an almost complete freedom from fever during recovery, and an intrapulmonary neosalvarsan deposit of an early and complete thrombosis within the field of application, whereby the absorption of the remedy is delayed so that its local effect is more prolonged and the diseased part of the lung is subjected to constant bactericidal and stimulant action. This treatment has been used in 8 cases, the advantages being quick suppression of pleural infection, the spontaneous expulsion

of all gangrenous parts of the lung, and recovery with little fever.

In a patient of 33 with gangrene of the lung, from lobar pneumonia with lobar abscesses and with cardiac insufficiency, injections were repeated at intervals of from 4 to 5 days, the x-rays showing a gradual decrease in the shadowed areas of the lung. Complete recovery followed after 10 weeks, and no relapse occurred during the ensuing year.

C L Wayman (J Missouri M A 25 372 (Aug) 1928) describes his method of irrigating lung abscesses with a 2 per cent solution of **butyn**. He anesthetizes the throat, larynx and upper trachea. Then he passes a tracheal catheter covered with one of soft rubber, attached to a soft rubber bulb of 3-ounce capacity which contains the irrigating solution. In a case of *tuberculosis* he used a 5 per cent solution of **calcium chloride** in distilled water. In *bronchiectasis* he uses the same solution. In *chronic bronchitis* he has found a 10 per cent solution of **alkaline antiseptic** very satisfactory. The operation does not cause any appreciable distress or discomfort.

The method of lung irrigation used by Garcia Vicente (Presse méd 37 1266 (Sept) 1929) consists of washing out each lung with isotonic physiologic solution of **sodium chloride** by means of a tube introduced through the larynx. He uses from 0.5 to 2 liters ( $\frac{1}{2}$  to 2 quarts) of the solution heated to 38° C (100.4° F). The duration of the irrigation is not more than from 3 to 5 minutes. After each irrigation the temperature of the patient rises, however, the writer observed that the reaction was con-

siderably lessened after repeated irrigation of one lung.

**CARCINOMA, PRIMARY.**—B R Kirklín, R Paterson and P P Vinson (Surg, Gynec and Obst 48 191 (Feb) 1929) believe that in the early stages carcinoma of the lungs may be divided, roentgenologically and clinically, into (1) bronchial, arising in the wall of a first to third degree bronchus, and (2) parenchymal, arising in the substance of the lungs. In the bronchial type there is the history of early, chronic, persistent cough, not very productive but often associated with hemoptysis or blood-tinged sputum and usually with loss in weight. A unilateral infiltrating density at the hilum is seen on the roentgenogram in some cases but more constantly, atelectasis of a lobe, due to bronchial obstruction. The parenchymal tumor is more latent, but there is definite loss of weight and a peculiarly ill-localized type of pain in the chest. Later, from invasion of a bronchus, the lesion may resemble the bronchial group. The x-rays show a rounded nodule with infiltrating edges lying free in the lung tissue and later an involvement of most or all of a lobe. In the later stages, the 2 types resemble each other, and the condition is obscured by pleural effusion or infection. Pathologically, the parenchymal tumor is usually an adenocarcinoma, whereas the bronchial tumor may be either an adenocarcinoma or epithelioma, the latter being confined to the bronchus and the lesion having a high grade of malignancy.

Graham (South M J 21 199 (Mar) 1928) illustrates the frequency of carcinoma of the lung by the report of Seydel, who found at the Pathological

Institute at Munich that nearly 2 per cent. of all deaths were associated with this condition. Like other carcinomas, carcinoma of the lung tends to ulceration and infection and is a frequent cause of pulmonary supuration. Of Fisburg's series of 36 cases of primary pulmonary carcinoma, 11 showed metastases to the brain or dura. Occasional operations have been done for brain tumor due to unrecognized primary carcinoma of the lungs. Primary carcinomas of the lungs arise in the bronchial lining epithelium, in the bronchial mucous glands, and perhaps also in the alveolar epithelium. In the first type, there are severe hemorrhages, pneumonia, occlusion of bronchi with partial atelectasis. In carcinoma arising from the bronchial mucous membrane, a frequent but not invariable finding has been that the tumor is confined to the wall of the bronchus and especially to the submucosa. When this limitation occurs, there is usually a diffuse narrowing of the lumen of the bronchus, so that it becomes thick-walled with a narrow lumen. The alveolar carcinoma is, as a rule, diffuse when first discovered.

S L Simpson (Quart J M 22 413 (Apr) 1929), in an analysis of 139 cases, found 76 of the oat-cell variety. Regional lymph node involvement was found in 104, while parietal pleura was invaded in 31. The pleura was also involved by direct invasion in 9 cases. Metastasis was usual, and occurred in the lung, apart from the direct spread of the primary growth, but only in 16 cases. Of the viscera, the liver, suprarenals and pancreas were frequently involved. Of 19 metastatic growths in the brain, 11 were in the cerebrum, 4 in the cere-

bellum and 4 in both cerebrum and cerebellum. The skull was involved in only 5 cases, the vertebral column in 29, in 7 of which signs of cord pressure were produced. In only 1 case was the spinal cord the site of a metastasis, and in this patient there was also a metastasis in the cerebellum. The most frequent symptoms were, cough, in 92 cases, pain in 89 cases, wasting in 72, dyspnea in 70, sputum in 70, pyrexia in 54 and hemoptysis in 50 cases. Physical signs vary greatly, depending on the site of origin, the stage in which the examination was made, and the numerous complications. Of 52 x-ray examinations, only 29 were definitely diagnosed as intrathoracic tumor. In 4, the diagnosis was made of aneurism, and in 3, of either aneurism or neoplasm. Pleural effusions were found in 30, of which 30 per cent were sanguineous. In 73 cases the diagnosis was correctly made, but in the majority the diagnosis was that of a complication, the primary carcinoma being overlooked. In 47 patients there was some evidence of tuberculous infection, but only 6 showed active tuberculosis. Seven showed healed tuberculous nodules, 30 calcareous glands in or about the hilar region, and 4, tuberculous mesenteric glands. Six showed evidence of syphilis, 4 having syphilitic aortitis, 2 of which also had syphilitic fibrosis of the testicles. One had syphilis of the lung and another, syphilis of the lung, liver and kidneys. In these 2, the syphilitic and carcinomatous changes occurred in the same area of the lung.

Metastases of the bones occur in a large number of cases of primary carcinoma of the lung, and in some cases

the symptoms caused by the bone tumors dominate the clinical picture, as in 4 cases reported by E F Hirsch and E W Ryerson (*Arch Surg* 16 1 (Jan-pt 1) 1928) In 2 of the patients, the secondary tumors removed surgically during life had been diagnosed as primary endotheliomata of the bone In a boy, dying at the age of 6, a diagnosis of metastatic carcinoma of the left tibia was made a year before death. At that time, a careful physical examination failed to disclose a primary tumor An analysis of the reports of so-called endotheliomata of bones demonstrates that many of these reports are based on a study of tissues removed surgically in cases in which an autopsy was not performed later or was not done with sufficient care to reveal a primary carcinoma of the lungs Therefore, a diagnosis of endothelioma of bones in surgically removed tissues containing cells resembling epithelial cells in the alveoli and tubules should be checked by a thorough post-mortem examination in which all parts of the body are carefully examined

O Klotz (*Canad M A J* 17 989 (Sept) 1927) reports the marked increase in the incidence of carcinoma of the lung From 1878 to 1900 it was found in 0.08 per cent of autopsies, whereas in 1922 it was found in 0.9 per cent Malignant tumors of the lung constitute 2 per cent of all malignant neoplasms The etiologic factors are obscure, but the influenzal epidemic and gassing during military service may have been factors or the distortion of parenchyma and bronchi from chronic pulmonary disease such as fibrosing pneumonia and bronchial pneumonia, with secondary cell metaplasia The incidence of

carcinoma of the lung among the miners of Schneeberg—75 per cent of whom die from it—is attributed to the high content of arsenic in the nickel and cobalt As the condition is less frequent in other mining districts, it is not due to pneumoconiosis alone

Klotz discounts tobacco smoke as a factor, but believes that incomplete combustion of motor-car fumes may be a cause In 23 of the 24 cases reported, the condition began in the bronchial mucosa In only 1 case were there no metastases In the majority of the tumors, the cells have an alveolar arrangement and cuboidal, polyhedral, or compressed and stratified cells may be observed in neighboring fields In a histologic analysis, Klotz found it impossible to distinguish between those arising from the bronchial mucosa and those from the alveolar epithelium

Of 27 cases of carcinoma of the lung, which came to autopsy, T C Hunt found that (*Lancet* 1 759 (Apr 13) 1929) in 21 the tumor was of the oat-celled type, which is considered to grow from the bronchial mucosa or from the alveolar epithelium In 3, there were mixed polygonal and columnar cells and in 2, squamous cells The average age was 50 years, the youngest patient being 27 and the oldest 79 In 26 cases there were 3 men to 1 woman The average duration from the first symptom to death was 6 months, the shortest, 1½ months, the longest, 17 months The right lung was involved in 16 cases and the right upper lobe, in 9 cases Bronchitis or influenza had preceded the symptoms of tumor in many of the cases The course usually is so gradual that the growth is well advanced when the



patient first notices symptoms. There are no characteristic symptoms. In many, there is pain in the chest due to an associated localized pleurisy, while pressure on adjacent structures produces hoarseness, dysphagia, dyspnea, stridor, and edema of the upper extremities, or face. Hemoptysis was present in 12 cases, and in 12 there were signs of pleurisy with effusion, the fluid being hemorrhagic in 5 and in 1, purulent. The diagnosis depended upon the exclusion of tuberculosis and true mediastinal tumor and the x-ray findings. The 3 x-ray characteristics, according to Kirklen, are density of the hilum, atelectasis and bronchiectasis. In 18 of the 26 cases a correct diagnosis was made before death. Treatment was only palliative. Deep x-ray therapy gave temporary relief. No relation to a previous occupation was discovered. The onset may be manifested by pain in the chest or by an acute febrile attack of "influenza" which is followed by ability to return to work. Early pressure signs are frequent. Hemoptysis and pleural effusions occurred in 48 per cent. The apex of the heart was unaltered in 40 per cent. Metastases were not a frequent cause of symptoms.

P. Gellein (Norsk mag. f. laegevidenk. 90:473 (May) and 90:569 (June) 1929), gives a report of 39 tumors of the lung treated in 2 Norwegian hospitals from 1913 to 1928. In 1, the tumor was benign, in the others malignancy was proved by necropsy in 33 cases or by the clinical course in 5 cases. Microscopical study of 33 showed 22 carcinomata and 11 sarcomata. Of the carcinomata, 12 were primary, 8 secondary, and 2 were uncertain. Of the sarcomata, 3 were

primary, 5 secondary, and 3 uncertain. The predominance of primary carcinoma is explained by the fact that only those tumors which gave rise to pronounced clinical symptoms were considered. Of the 12 carcinomata, 7 were in the left lung and only 2 in the right, differing thus from the usual experience. Sixteen of the carcinomata occurred in women. Of the primary growths, 9 were in women and 3 in men. The average age was 60.9 years. The statistics from the sarcomata were too small to justify any conclusion. In the period from 1923 to 1928 there were 9 cases among 19,672 patients, as compared with only 2 among 20,379 patients in the period from 1916 to 1922. No etiologic factor was discovered.

**ETIOLOGY.**—Rosenbloom and Shucher consider smoke an etiologic factor in the cases they studied, while inheritance did not appear to play any rôle. The condition may be confused with an acute infectious disease.

W. Meyer (Arch. Surg. 18:307 (Jan.-pt. 2) 1929) also thinks that cancer of the lung may be due, like other cancers, to chronic irritation, such as that caused by the constant inhalation of smoke, soot, ashes or other impurities of the air. The more frequent incidence in the lower right lobe is explained by the fact that the right main bronchus is straighter and larger than the left main bronchus. The fact that from 85 to 90 per cent of cancers of the lung develop primarily in the larger bronchus and not in the parenchyma of the lung is probably explained by the very rich blood supply of the parenchyma. Meyer emphasizes that, for improvement of results in pulmonary malignancy, early diagnosis

and aggressive radical treatment of the cancer while it is still limited to the bronchus are essential

R E Smith (J Cancer Research 12 134 (June) 1928), having found no definite etiologic factor in 48 cases of human carcinoma of the lung, exposed groups of mice to coal-tar fumes, to fumes from the exhaust of a Ford engine, and to a painting with gasoline. Carcinoma of the lungs did not occur in those exposed to coal-tar fumes but developed in 1 (3.8 per cent) of those exposed to exhaust gas and 1 (3.4 per cent) painted with gasoline. The incidence was not, however, markedly greater than the spontaneous occurrence of lung carcinoma in mice. Neither the author's experiments nor clinical observations gave any support to the theory that carcinoma of the lungs is caused by exposure to fumes of coal-tar or gasoline.

A Konrad and W Franke (Deut med Wchnschr 55 652 (Apr 19) 1929) conclude (1) the relative as well as the absolute frequency of cancer of the lungs has been increasing in recent years, (2) the percentage of men is larger than that of women, certain races are more subject to the disease than others, (3) in Königsberg the immigrating eastern Jew seems to be especially subject to primary carcinoma of the lungs. It is not possible to trace the increasing frequency to any single factor, such as the inhalation of dust, smoking, tarring of streets, or certain occupations.

**SIGNS AND SYMPTOMS**—C. V. Weller (Annals of Int Med 2.725 (Feb) 1929) in 12 cases of primary carcinoma of the lung, found cough in 5, dyspnea in 4, loss of weight in 4;

pain in the chest in 3, hemoptysis in 3, pupillary changes in 3, edema and congestion in the upper half of the body in 3, clubbing of the fingers in 3, pain in the back in 3, pain in the legs in 3, extension through the thoracic wall in 3, recurrent laryngeal paralysis in 2, pleural effusion in 2, weakness in 2, abdominal pain in 2, metastases in the cervical nodes in 2, dysphagia in 2, fever in 2, cyanosis in 1, pain in the arms in 1, sputum without blood in 1, vomiting in 1, pulses not synchronous at the wrists in 1, drooping of the eyelids in 1, coma in 1, and paralysis of the lower extremities in 1.

W H Crohn and B Weber (Med Klin 25 1209 (Aug 2) 1929) had 11 cases of carcinoma of the lung which came under their observation last year, 10 being in men. The ages ranged from 40 to 71, the average being 50 years. Pain was variable, but was generally slight. In 1 case in which the ribs were completely destroyed and could be cut like wax, the patient had but little pain and needed only small amounts of narcotics. Some patients were entirely free from fever until one or two days before death when there was a sudden rise, while others had intermittent or remittent fever and just before death were free from fever. The fever is caused by the flooding of the body with toxins. While the body has the strength to make antitoxin, according to the authors, the appearance of the fever is delayed. It is always an unfavorable symptom. The toxin is cited as the probable cause of the general illness, presenting symptoms resembling those of the last influenzal epidemic, especially gastric disturbances. In some cases the sputum was blood-

stained, in others, it showed nothing unusual. Severe hemorrhage was rare. Secondary pleural exudations occurred in some cases, but this was never hemorrhagic. Dyspnea was variable, but as a rule astonishingly slight. In most cases, the growth commenced in the hilus of the lung. The x-ray is considered an essential to diagnosis. Metastases were sometimes absent, but in some cases were present in the liver.

B. P. Stivelman (J. A. M. A. 91:1690 (Dec. 1) 1928) mentions blood-spitting, dyspnea, severe and prolonged pain in the chest, and afternoon elevation of temperature as cardinal symptoms. Of the early pulmonary malignant growths, the endobronchial tumors form at least 85 per cent. From the radiological standpoint, primary pulmonary neoplasms may be divided into the pulmonary and the pleural, the former are further classified as endobronchial, hilar, lobar, and excavating, the latter into those with and those without effusion. The author believes that tumors near the hilum and those which spread along the bronchial tree cannot be diagnosed without an x-ray examination in the early stages. Early bronchiogenic tumors which have not grown large enough to obstruct the bronchus and flat pleural tumors may, however, be missed in such an examination, though physical observations may point to their existence.

Central tumors, regardless of their point of origin, are visible radiologically long before other methods of examination suggest their presence. If large effusions are present, tumors cannot be diagnosed by the x-rays unless the fluid is aspirated and a pneumothorax induced, when the

radiograph will indicate the contrast between the growth and the surrounding tissue. Spontaneous free or interlobar empyemas and pulmonary abscesses not of metapneumonic origin, when they occur in persons past middle life, are in themselves suggestive of a possible malignant condition. In difficult cases, for a correct diagnosis, x-ray films must be taken in oblique positions, bronchography with iodized oil is helpful, and, particularly, early bronchoscopy must be employed.

B. R. Kirklin and R. Paterson (Am. J. Roentgenol. 19:20 (Jan.) 1928) classify primary carcinoma of the lung into bronchial and parenchymal. The latter are usually adenocarcinoma and at first run a symptomless course. They may be divided into 3 types: (1) Nodular, which is the most common and consists of an irregularly infiltrating nodule lying in the parenchymal field, (2) the lobar type, which is of homogenous density and occupies the lobe and has an infiltrating edge, (3) the infiltrating type, where there is increased density of the bronchial tree radiating from the hilum. The conditions to be considered in the differential diagnosis include metastatic tumor, various inflammatory processes, tuberculosis, mediastinal tumor and venous congestion. The typical bronchial cancer produces a mass at the hilum or an atelectasis. Later the pleura becomes affected, and the fluid obscures the whole picture, or infection supervenes distal to the malignant lesion with similar confusion of the roentgenologic manifestations. The differential diagnosis may require consideration of abscess, benign tumor, cyst, tuberculosis, or venous conges-

tion The early nodule grows steadily, infiltrating an anatomic lobe and becoming lobar and forming a dense, irregular mass or growing into a bronchus and later becomes indistinguishable from typical bronchial carcinoma which produces a mass in the hilum, or an atelectasis

Discussing the bronchial type of primary carcinoma of the lung, upon a basis of 28 cases observed in the Mayo Clinic since 1923, Kirklin and Paterson (*ibid* 19 126 (Feb) 1928) found that the major roentgenological characteristics of bronchial carcinomas are increased density of the hilum, atelectasis or bronchiectatic appearance Thickening of the hilum is very common However, an important distinguishing feature in bronchial carcinoma is that the abnormal density is confined to one side Atelectasis is not so constant, however, it is of great value in diagnosing these tumors which lie largely within the mediastinum The clinical picture and history are, as a rule, of considerable assistance in establishing a diagnosis As the lesions grow, the characteristic appearances become concealed by secondary processes These are stenotic, infective, pleuritic and metastatic Pyogenic infection causes either bronchitis, pneumonitis, or an abscess Pleurisy is a frequent complication in the late stages, the fluid being usually blood stained, non-purulent, and having a marked tendency to recur after tapping For this reason, x-ray examination must be made within a few hours after the tapping Metastases in the supra-clavicular and mediastinal nodes occur quite early Pathologic examination of the 28 growths showed about equal numbers of epithelioma

and adenocarcinoma, most of which were highly malignant The dominant early symptoms were unusually persistent cough and periodic hemoptysis or constantly blood-tinged sputum Often pain and dyspnea did not appear until late in the disease As in all cases of carcinoma of the lung, loss of weight is a striking symptom. The hilar density is roughly triangular, apex out It has no clear-cut edge, but throws out strandlike processes into the lung tissue along the bronchial tree Atelectasis, the second characteristic, is not constant, it appears over the lobe tributary to the bronchus involved, and although it is not diagnostic of malignant disease, it is diagnostic of organic broncho-stenosis, for which a cause must be sought Bronchiectasis, which sometimes occurs as a result of the bronchial obstruction, is evident as a mottled fan-shaped shadow in the area affected

T L Hyde and G W. Holmes (Am J Roentgenol 18 235 (Sept) 1927) reported in tabular form the findings in 30 cases of primary carcinoma of the lung, chiefly of bronchial character, and also of 1 teratoma The x-ray findings are rarely pathognomonic, and a correlation of clinical and roentgenologic evidence is necessary for the diagnosis A dense hilar mass with nodules and radiations extending into the lung field is suggestive and the most common lung tumor is carcinoma of the right bronchial tree in a man of about 50 years, appearing in the x-ray findings as a hilar shadow with radiations extending into a small immobile lung field, which may, however, be obscured by shadows from a pneumonic or other complicating process The

carcinoma rarely arises in the alveolar epithelium and usually from the bronchus, or it grows into the lumen and extends along the bronchial tree or tends to encircle the bronchus and extend into the lung as a tumor mass. Sarcoma generally simulates the second type of carcinoma, but originates more commonly along the smaller bronchi of the lung. Teratoma are generally cystic and have smooth surfaces. They contain fluid and occasionally bone and teeth or even parts of a fetus. Mixed tumors are circumscribed masses of varying size and location in which cartilage and bone predominate. Teratoma produce smooth, dense, oval shadows near the mediastinum, sometimes with evidence of contained fluid or bone. Teeth also may be identified. Mixed tumors appear as circumscribed lobulated shadows containing areas of the density of bone which differentiate them from echinococcus cysts. They may occur in any location. On the affected side the diaphragm may be high and fixed and the interspaces narrowed. The mediastinal contents are displaced toward the side of the tumor unless it is very large or there is excessive fluid. The lung usually shows a compensatory emphysema.

**COMPLICATIONS** — *Abscess* — M. Fishberg and E. H. Rubin (Am. J. M. Sc. 178 20 (July) 1929) mention that while pulmonary excavations are commonly due to tuberculosis, or abscess, or gangrene, neoplastic disease is also an important cause, and report 15 cases of primary carcinoma of the lung in which clinically and at necropsy cavities were found. About one-third of pulmonary neoplasms break down, leaving a cavity, after the necrotic tissue is

eliminated, varying from small cavities to those that destroy an entire lobe. The gross appearance of the necrotic tumor may resemble fibrocaseous phthisis and the surrounding tissue usually presents an inflammatory area. Toward the periphery, emphysematous lung tissue may be observed but more frequently, owing to occlusion of the supplying bronchus, atelectasis of the alveoli is encountered. Concomitant active tuberculous lesions may be found, while fibrotic changes of the apical pleura, due to old tuberculosis, are very common. Metastasis to other organs is as frequent as in cancer without excavation. Cavity formation occurs mostly in primary tumors and is uncommon in metastatic growths. The excavation is due to an anemic necrosis, the tumor outgrowing its blood supply, the necrotic tissue being discharged through the bronchus. Superinfections with pyogenic organisms, spirochetes, or spirillæ may be an important factor. Tuberculosis can be excluded by the absence of tubercle bacilli and the fetor of the sputum in cancer. The lesion in tuberculosis of the lung is rarely unilateral, while in primary carcinoma this is the rule. Severe pain, and especially hyperesthesia of the thorax, is not common in tuberculosis, while it occurs in 90 per cent of the patients with malignancy. Dyspnea, an early symptom of cancer, is not usual in tuberculosis. A flat note on percussion of the apex and down the side to the base is rare in tuberculosis but is the rule in cancer. The differential diagnosis of malignant abscess from those due to other causes is difficult. The age of the patients, and the fact that in many cases of pulmonary ab-

cess some cause, such as tonsillectomy or extraction of teeth, is usually found is important. All cases of apparently primary abscess of the lung of recent onset in elderly individuals should be considered as possibly due to a broken down neoplasm.

C. M. Neiberg and H. Lerner (M. J. and Rec. 130 270 (Sept. 4) 1929) report a primary mediastinal pulmonary lymphosarcoma associated with lung abscess and gangrene and M. P. Harvier and A. Lichtwitz (Bull. et mém. Soc. méd. d. hôp. de Paris 52 1116 (July 5) 1928) report a suppurating carcinoma of the right lung with irregular high temperature, abundant purulent expectoration and cavitation in the parenchyma of the lung adjacent to the hilum. The cavity could be delineated by lipiodol.

**Atelectasis**—Complete atelectasis of the left lung from blocking of the left main bronchus by a carcinoma is reported by J. D. Kernan and A. J. Cracovaner (Arch. Surg. 18 315 (Jan.-pt. 2) 1929). By the use of surgical diathermy through a bronchoscope and the application of radium seeds—the tumor apparently disappeared, with symptomatic relief. The diagnosis was made by the use of the bronchoscope.

In the case of K. Kornblum (Am. J. Roentgenol. 18 230 (Sept.) 1927), there was a primary bronchiogenic carcinoma of the lung with atelectasis and pleural effusions shown by a successive x-ray examination. At autopsy the growth was found to have invaded the right auricle, involvement of the pulmonary vessels coming from the right lung, and to have produced metastases to the brain. The symptoms from the cerebral growths over-

shadowed those from the primary lung condition.

Brunn has reported 2 cases in which the x-ray showed a tumor the size of an orange in the upper part of the chest. While the tumors were identical on the film, the first operation proved to be an osteochondroma arising in the intervertebral disk and the other a cyst arising from the posterior mediastinum.

In the case reported by L. Babonneix, R. Huguenin and A. Widiez, a man of 51 had syphilis and tuberculosis and a mucous type of carcinoma of the lung (Bull. et mém. Soc. méd. d. hôp. de Paris 52 138 (Feb. 9) 1928).

**DIAGNOSIS**—M. W. Marsman (Nederl. Tijdschr. v. Geneesk. 2 4498 (Sept. 15) 1928) has seen 15 primary tumors of the lungs in the past 2 years. Only 1 patient was a woman. The diagnosis is suggested by stubborn cough, bloody sputum, and increasing weakness in a person over 40 who has previously been well. Loss of weight comes later, shortness of breath, earlier than in tuberculosis. In 1 patient it was uncertain whether a tumor or echinococcus cyst was present. From an intradermal injection of 0.5 c.c. (8 minims) of echinococcus serum (Casoni's reaction), the reaction was positive for echinococcus, but at operation carcinoma was found. The blood picture aids in differentiating from lymphogranuloma and lymphosarcoma of the mediastinum. A substernal goiter may give an x-ray picture suggesting a lung tumor, but the substernal goiter moves upward on swallowing, and this can be seen on the fluoroscopic screen. Metastases were present in the brain, femur, and pleura in

the patients observed. The age of the patients ranged from 43 to 61. Pain behind the sternum, shortness of breath, which is increased by movement, and neuralgic or rheumatic pains in the arm or along intercostal nerves, without any physical signs being found to explain the condition, are considered to be suggestive.

I. S. Hirsch (Radiology 9 470 (Dec) 1927) finds that different types of malignant tumors may resemble each other so closely that it is impossible to differentiate between them, and that even benign tumors cannot always be distinguished from those that are malignant by the roentgen appearance alone. Secondary tumors usually produce multiple, definitely circumscribed, rounded shadows. The appearance presented in a tumor of the lung is due to the following changes: tumor, stenosis-atelectasis, inflammation, necrosis, cirrhosis, fibrinous and exudative pleuritis, and the adenopathy which may be present. Intrabronchial injections of lipiodol are of some value in the diagnosis.

The difficulty in diagnosing a primary carcinoma of the lung is emphasized by U. Simondi (Riv di clin med 29 290 (Mar 30) 1928), who remarks that it is well to think of the possibility of cancer of the lung whenever the clinical symptoms of a case present discordant elements. However, the diagnosis in cases of cancer of the lung associated with progressive tuberculosis is usually practically impossible, owing to the fact that the characteristics of a grave and progressive tuberculosis of the lung, with high fever, together with the general breakdown and the opacity of the field, as revealed by x-ray examination, may predominate to such

an extent as to obscure everything else.

The conclusions reached by S. M. Derischanooff (Ztschr f Krebsforsch. 26 275 (Mar 6) 1928), in reporting the case of a man aged 22, who had a carcinoma of the bronchus with pulmonary and cerebral metastases, together with pulmonary tuberculosis and tuberculous meningitis, were: (1) The cancer and the tuberculosis existed symbiotically in this patient, (2) tuberculosis combined with cancer is usually exudative, (3) it is extremely difficult to demonstrate tubercle bacilli in the sputum of patients suffering from both tuberculosis and cancer of the lung, (4) the combination of pulmonary tuberculosis and pulmonary cancer is extremely rare up to the age of 30.

R. Cobet (Med Klin 25 895 (June 7) 1929) asserts that tumors of the lung required differentiation from chronic pneumonia, pulmonary tuberculosis, syphilis of the lung, actinomycosis, abscess or gangrene of the lung, primary pathologic disturbances of the esophagus, aortic aneurysm and cardiac insufficiency.

The most common tumor is the bronchial carcinoma. In the early stages, physical examination seldom shows the abnormality. Anemia is usually absent, but the blood may show eosinophilia. Clubbed fingers are present in some instances but are not typical. A protrusion of the wall of the chest is rare. The most characteristic symptom is dyspnea, while bronchial stenosis or pleuritis without increasing temperature suggest the presence of a tumor. Diagnosis may be solved by metastases generally developing either in the sub-

clavicular and axillary lymph nodes or in the vertebræ

A Lemierre and A Lambling (*Bull et mém Soc méd d hop de Paris* 52 1097 (July 5) 1928) report the case of a woman of 33, who for 2 years had a focus of subacute gangrene in the right lung with marked pulmonary sclerosis followed by subphrenic pyothorax and a septic embolism of the left kidney, both due to the same micro-organism. On autopsy an unsuspected cancer of the lung and a large putrid abscess of the right base and in the wall of the left kidney were found.

As a means of differentiation between tumor of the lung and pulmonary tuberculosis, E Schwalm (*Beitr z Klin d Tuberk* 68 667, 1928) recommends the production of a pneumothorax followed by careful x-ray examination.

**TREATMENT — Thoracoplasty, Axillary Route**—To avoid the extensive operative denudation of the thorax and the division of many vessels with the attendant shock and disfigurement, P Duval, J Quenu and H Welti (*J de Chir* 32 641 1928), place the patient on the normal side with the pelvis held fixed and the arm raised over the head. The skin is incised parallel with, and a little anterior to, the border of the latissimus dorsi, the attachments of which to the last 4 ribs are sectioned. The upper part of the incision proceeds medial to the axillary vessels and on to the pectoralis major. The serratus magnus is exposed and sectioned close to the costal attachments. The scapula, serratus magnus and latissimus dorsi are retracted posteriorly, the pectorals anteriorly, and the ribs resected by the usual technic.

An incision of the lower border of the pectoralis major may be necessary to expose the first rib. A long and properly curved periosteal elevator and a costotome are required. The operation causes minimum deformity of the chest without scoliosis or impairment of the function of the arm or shoulder. Only the external mammary and a few perforating branches of the intercostal nerves are cut. The ribs may be resected almost completely.

F Rupp (*Deutsche Ztschr f Chir* 206 246, 1927) reports 25 resections of the thoracic wall from the Clinic of the University of Munich in the period from 1919 to 1927. In 12 instances the operation was performed for carcinoma originating in the female or male breast, in 8, sarcoma, 1, tuberculosis, and 1, x-ray ulcer of the thoracic wall. The site of the tumor is valuable in diagnosis. Myelogenic, central sarcomata are found chiefly in the sternum and clavicles, seldom in the ribs, true sarcoma, almost invariably in the body of the sternum, chondrosarcoma, in the manubrium as well as the body of the sternum. Periosteal sarcomata nearly always involve the ribs and the lower part of the chest, while chondrosarcoma is most common near the parasternal line of the fifth to the tenth ribs. Recurrences are usual near the border of the sternum or in the body of the manubrium. Persistent neuralgic pains precede the local swelling. X-rays, both in various planes and stereoscopically, together with careful fluoroscopy at various angles, are very important in the diagnosis. Careful search in the regions of a primary lesion and other parts of the body is important. Since



carcinoma is rarely benefited by operation, few inflammatory processes require the resection. Benign tumors require resection only when pressure on a nerve causes pain or when wedging of the tumor mass in between the ribs causes dangerous interference with the function of respiration.

C Hirsch (Deut med Wchnschr. 54 2057 (Dec 7) 1928) points out that malignant tumors of the upper air passages formerly necessitated bloody operations, which frequently resulted in fatalities. He, therefore, advocates surgical diathermy as the best therapeutic method, not only because it is practically bloodless, but also because the electrode can be employed in more critical and delicate manipulations than can the surgeon's knife. A local anesthetic should precede the treatment. Diseases of the larynx and of the esophagus, however, should not be treated in this manner, because in these organs edema and strictures frequently develop after diathermy.

#### CICATRICAL CONTRACTION

—F Krampf (Ztschrif Tuberk 51 35 (May) 1928) has carried out both clinical and experimental studies on cicatricial contraction of the lungs and considers that contraction is due almost entirely to inflammatory processes. These studies include pneumonia of various types, as croupous pneumonia, inflammation of the lungs in measles and influenza, and inhalation of phosgene and other gases, pneumokoniosis, tuberculosis and syphilis, pulmonary abscess, and pathologic changes in the air passages as in so-called congenital bronchiectasis, bronchial stenosis and bronchial occlusion. The pathologico-anatomic results of contraction in

the lungs themselves were found to be local emphysema and secondary bronchiectasis. In experiments on dogs, contraction was produced (1) by ligation of branches of the pulmonary artery, (2) by simultaneous ligation of these branches and the veins leading to the heart, (3) usually but not always by ligation of the cardiac veins alone. The first procedure promised results in certain forms of bronchiectasis.

**CONGESTION.**—A condition of transient pulmonary congestion which has attracted attention recently, *viz*, a retrogressive chronic pneumonia, is described by J Felix (Wien Arch. f inn Med 15 309 (May 15) 1928). Influenza has been responsible for many cases of chronic pulmonary infiltration. Eliasberg and Neuland term a similar condition "epituberculosis", they consider it as a definite pathological entity, found among tuberculous children, and consisting in a chronic non-specific pulmonary infiltration. The patient's general condition is but slightly affected, and usually there is little or no fever. The respiration is normal, cyanosis is absent, there might be slight cough. On percussion the affected side is very dull, especially over the upper lobe, the auscultatory signs are very slight, there may be bronchial breathing, but râles are few or absent. The prognosis is good. The author concludes that the differential diagnosis is of great importance. Influenzal bronchopneumonia may be recognized by the sudden onset, thickly coated tongue, fever, and a high leukocyte count.

**TREATMENT.**—In advocating carbon dioxide in the treatment of hypostatic pulmonary congestion, R E

Burns and W S Middleton (Am J M Sc 177 564 (Apr) 1929) refer to Kaya and Starling's conclusion of their animal experimentations with carbon dioxide to the effect that "a moderate increase of carbon dioxide in the blood has no injurious effect on the heart, and may possibly, in fact improve the functional capacity of the heart muscle" The authors also state that Jerusalem and Starling's studies reveal a relaxation of the heart if the carbon dioxide tension of the blood circulating in the coronary system is increased

The clinical applications of this fact have been varied Y Henderson and H W Haggard utilized carbon dioxide to combat the respiratory depression of *carbon monoxide poisoning*

Another indication for its use may be found in the *hypostatic pulmonary congestion* occurring in post-operative surgical cases, and in the aged and debilitated individuals compelled for one reason or other to maintain a fixed recumbent position

Since 1925 inhalations of 5 per cent carbon dioxide in 95 per cent oxygen have been given to a series of 10 patients with fractures of the neck of the femur admitted to the Orthopedic Service at the State of Wisconsin General Hospital This group constituted the poorest possible physical risk All, in whom the gas was used, were very old The results were 2 cases died, 6 improved and in 2 patients there was a dramatic relief of respiratory embarrassment

No rule can be formulated for the dosage of carbon dioxide under these circumstances Strict attention must be paid to the respiratory response, and to the comfort of the patient

The method should be considered

*prophylactic* rather than curative The suspicion or actual existence of a pneumonia is an absolute contraindication to its use

**EDEMA**—Acute pulmonary edema during delivery is discussed by R Bustos Moron (Prensa med argent 15 1193 (Mar 10) 1929), who believes that in the development of this syndrome pregnancy plays an important part The reports of acute pulmonary edema in patients who are not pregnant, are few in number compared with the cases in which this syndrome is described during pregnancy or delivery

**FIBROSIS**—The late results of pulmonary fibrosis have been investigated by W Burton Woods (Lancet 1 596 (Mar 24) 1928) and he reaches the following conclusions

1 A diagnosis of post-pneumonic fibrosis is only justified when the physical signs of this condition are definite and persist over a period of some months

2 When permanent fibrosis of a lung results from bronchopneumonia, bronchiectasis is not an inevitable sequela

3 Fibroid lung is compatible with fair health over a period of many years, provided it is not associated with bronchiectasis

4 The prognosis of bronchiectasis in childhood is always grave and death before adult life is to be anticipated

C D S Agassiz and W J Gill (Arch Dis Childhood 3 1 (Feb) 1928) have found non-tuberculous fibrosis of the lung to be a very common disease in children They believe that it is often overlooked or else diagnosed as pulmonary tuberculosis. They found a high incidence

of measles, whooping cough and pneumonia in the previous history of their cases. Generalized granulomatous lymphadenitis with fibrosis of the lungs has been observed by C. L. Connor (Arch Int Med 42 822 (Dec) 1928). He reports the case of a boy with a chronic progressive condition of the lungs, lymph nodes and spleen which lasted for 30 days, and ended with massive consolidation of the lungs. At autopsy there was widespread enlargement of the lymph node, a diffuse fibrosis of both lungs and a large somewhat granular spleen. The bone marrow was moderately hyperplastic. The causative organism was not found.

**INFARCTION**—The frequency with which single or multiple pulmonary infarcts occur in children is commented upon by H. Schadow (Jahrb f Kinderh 123 272 (Apr) 1929) who reports 13 cases of pulmonary embolism and pulmonary infarction occurring twice in purulent endarteritis of the umbilical artery with subsequent extensive thrombosis, once following sinus thrombosis in whooping cough with bronchopneumonia, once in heart thrombosis in whooping-cough, 3 times in sinus thrombosis following measles, once following sinus thrombosis and thrombosis of the vena cava and of both iliac and both renal veins, once following thrombosis of the femoral vein, once in otogenic infective sinus thrombosis, thrombosis of the jugular vein and mural endocarditis in the right auricle, and twice in autochthonous thrombosis of branches of the pulmonary artery.

The condition is also not infrequent and very serious in adults. The average age of the patients seen by C. E.

Farr and R. Spiegel (Ann Surg 89. 481 (Apr) 1929), who recovered was 35 years, while it was 42 in those who died. Reviewing an additional 15 cases of post-operative pulmonary infarction, bronchopneumonia is differentiated by a history of bronchitis, a more gradual onset, less marked pain, and the absence of blood from the sputum. The physical signs of the 2 conditions may be similar, although the author's patients with pulmonary infarction were younger than those with pulmonary embolism, and the infarction occurred earlier in the post-operative period than the embolism. In fatal cases of pulmonary embolism, cardiac embarrassment seems to be more important than the sudden encroachment on the margin of safety in the lung tissue.

**Registration of the movements of the thoracic wall** is accomplished by a simple apparatus devised by Anthony and Hansen (Beitr z Klin d Tuberk 72 214 (July 15) 1929). By means of this thoracograph, it was found that in normal persons the differences between the movements of the walls of the 2 halves of the thorax were slight, but in unilateral *pulmonary tuberculosis*, *pleural exudation*, *pleuritis sicca* and *pleural adhesions*, they were marked and served as a method of diagnosis.

**RHEUMATIC LUNG.**—A. E. Nash (Lancet 2 10 (July 10) 1928) described a new type of pathological consolidation of the lungs associated with evidence of active rheumatism elsewhere in the body and usually in the heart. This type of consolidation probably accounts for the patches of dulness met with at the left base in association with rheumatic carditis.

and hitherto attributed to collapse from pressure

**SPIROCHETAL DISEASE.** — In discussing pulmonary *sporotrichosis*, W D Forbus (Am Rev Tuberc 16 599 (Nov) 1927) states that although over 400 cases of all types of *sporotrichosis* have been reported, only one case with pulmonary localization was satisfactorily substantiated. In the author's case the lesions, though most probably due to infection by *sporotrichum*, were found in the lungs and spleen. These lesions appeared somewhat similar to those produced by the tubercle bacillus, but were not identical with them. Animal inoculations were negative.

The diagnosis and treatment of fungous diseases of the lungs simulating tuberculosis have been investigated by G Zickgraf (Tuberkulose 9 111 (June 10) 1929), who asserts that pulmonary *streptothricosis* and similar fungous diseases are more frequent than is commonly assumed. They often simulate tuberculosis. The anamnesis in such cases usually reveals a suppurative bronchitis of long standing. Characteristic is the absence of fever and the toxic symptoms that are usually observed in tuberculosis. The results of percussion, auscultation and roentgenoscopy are nearly the same in fungous diseases and in tuberculous conditions. Of some significance for the differential diagnosis is the fact that the morbid changes in fungous diseases nearly always affect the lower lobes, and also that they progress slowly. Bacteriologic examination of the sputum is of great importance. If fungi are found, the diagnosis is definitely established.

In the course of his work on fuso-

spirochetal disease of the lungs, with especial reference to its bacteriology, pathology and experimental reproduction, D T Smith (Am Rev Tuberc 16 584 (Nov) 1927) reports the results of a further study of 30 new cases, including a summary of the results obtained by other workers in 118 cases previously reported. He comes to the conclusion that a number of pulmonary conditions, pulmonary gangrene, pulmonary abscess, certain types of unresolved pneumonias, bloody bronchitis, putrid bronchitis and primary bronchiectasis, which were formerly regarded as distinct entities, are in reality different manifestations of the same infection. The organisms constantly found in (1) the gums of patients suffering with these infections, (2) in washed sputum and (3) in diseased pulmonary tissue at necropsy, are spirochetes, fusiform bacilli, cocci and vibrios.

M Leon-Kindberg, R Cattani and P Adida (Bull et mem Soc méd d hop de Paris 52 679 (May 10) 1928), reviewing the clinical, anatomical, bacteriological and experimental data culled from the literature on putrid bronchopulmonary spirochetosis, conclude that in pulmonary gangrene and in putrid abscess of the lung, the spirochetes play an important rôle. They are unable to isolate a definite type of spirochete.

**SYPHILIS** — The clinical symptoms of syphilis of the lungs, according to C Schilling (Fortschr a d Geb d Röntgenstrahlen 37 342 (Mar) 1928), are in the main not characteristic. Hemoptysis is frequently observed in gummatous lesions. Fever may be present or absent, if present, night sweats and general weakness

are observed. In late stages the respiratory embarrassment stands in the foreground. The process may be complicated by pleuritis, bronchiectasis and pyopneumothorax. The physical findings point to localization in the hilus and middle and lower lobes, the apices are usually found free from infection. The percussory and oscultatory findings are variable. The x-ray findings are also variable, the most frequent findings being an interstitial infiltration in the area of the hilus with spoke-like ramifications in the lung tissue. Syphilitic processes in the lung during the secondary stage are scarcely known.

The miliary type of pulmonary syphilis has been studied by M. Favre and N. Contamin (Lyon méd. 142 121 (July 29) 1928) and they report a case of a patient aged 19 years, who presented all the physical and functional signs of miliary tuberculosis. The patient was cyanosed, had a rapid pulse, and the chest was full of râles. The sputum was negative for tubercle bacilli. The autopsy showed extensive lesions of sclero-gummatous syphilis. The nodules were of various dimensions, from a small walnut to lenticular size. The knowledge of this type of miliary syphilis will avoid the mistaking of these small circumscribed, fibrous, gummatous nodules for tubercles. Clinically the absence of bacilli in the sputum of a patient presenting cyanosis and dyspnea resembling miliary tuberculosis, should suggest the possibility of this type of syphilis.

Two cases of pulmonary syphilis were discussed by J. Hekman (Nederl. Tijdschr. v. Geneesk. 2 4754 (Sept. 29) 1928) which would have been diagnosed as tuberculosis except for

the continued absence of bacilli in the sputum. The Wassermann test in both cases proved to be strongly positive.

In a case reported by R. C. Allison (Am. J. Roentgenol. 22 21 (July) 1929), x-rays taken during an attack of influenza showed a nodular consolidation extending out from the root of the right lung and invading the parenchyma of all 3 lobes. The lesion resembled an infiltrative type of Hodgkin's disease. Three weeks after treatment by salvarsan and mercury the films showed a remarkable resolution of the process. After 4 months of treatment the lesion had almost completely disappeared.

Syphilitic disease of the pulmonary arteries has been studied by D. C. Hare and J. M. Ross (Lancet 2 806 (Oct. 19) 1929) who state that although syphilitic arteritis is a rare disease, it is worthy of notice. These cases differ from other cases with arterial lesions in the lesser circuit, in that there is no antecedent pulmonary, bronchial or cardiac lesion. The lesion takes the form of an obliterative arteritis, attacking mostly the smaller branches and the arterioles. This condition leads to a raised blood-pressure in the lesser circuit. The right side of the heart becomes greatly dilated and hypertrophied. Clinically, the cases are characterized by dyspnea, cyanosis and hemoptysis, and in the late stages by a progressive congested heart failure with a regular pulse.

**SURGERY OF LUNG.**—R. A. Young (Lancet 1 593 (Mar. 23), 697 (Apr. 6), 805 (Apr. 20) 1929) refers to the improvements in the diagnosis due to x-ray examinations, the intra-tracheal use of lipiodol, broncho-

scopy, thoracoscopy and laboratory tests. Operative technic has improved to lessen shock and exposure, as well as by anesthetic apparatus controlling the degree of inflation and deflation of the lungs, the use of local anesthesia. Operations upon the chest are used to place the part at rest, to evacuate abnormal exudates, to remove foreign bodies, new growths, diseased or damaged lung tissue, to collapse cavities, and to effect decompression when there is a disturbance of intrathoracic relations.

*Lung abscess* is to be considered first as to cause, and this may influence the treatment. **Drainage** is to be avoided in an acute lung abscess until localization and adhesions have occurred, but is very valuable in non-acute and chronic abscesses. Most of the *tumors of the lung* producing abscess are malignant, are rarely amenable to surgical treatment except when a primary growth originates in the parenchyma at a distance from the hilum so that a **lobectomy** is practicable. *Foreign bodies* and *new growths in the bronchi* may be removed by the **bronchoscope**. For *bronchiectasis* the following operations are suggested: (1) **Drainage** by pneumotomy, which is suitable only when there is a large single cavity, (2) **ligation** of a branch of the pulmonary artery of the affected lobe (a practically obsolete operation), (3) **avulsion** of the phrenic nerve; (4) **thoracoplasty**, (5) **surgical lobectomy**, (6) **cautery lobectomy**. The mortality of lobectomy is about 50 per cent and of cautery lobectomy, 20 per cent.

In *empyema*, the etiology is a factor of importance, determining the time and the type of operation. The methods used in *acute empyema*

are aspiration, drainage, the closed method by thoracotomy with or without rib resection, and drainage by open method. Irrigation of the pleural cavity by various antiseptic solutions (**Dakin's solution**) and measures promoting expansion of the collapsed lung, may be valuable. For *chronic empyema*, **thoracoplastic** procedures to collapse the chest wall to meet the lung, and **chemical decortication** have been used, all with a high degree of mortality. In pulmonary and pleural tuberculosis, empyema is very serious and should not be treated by open drainage. **Oil injections** have some value. **Hemothorax**, usually the result of a malignant tumor, is a serious and often rapidly fatal condition. In *traumatic hemothorax*, absorption usually occurs, but when the effusion is large, aspiration should be done early. In *acute infective hemothorax*, immediate drainage is required. *Benign tumors* may frequently be removed by operation, and malignant tumors are rarely diagnosed early enough for extirpation. For mediastinal disease, operative measures have a very limited use. An acute localized *mediastinal abscess* may be drained if accessible and *benign tumors* extirpated, but malignant tumors are practically never successfully treated by operation.

J. Alexander (J. Michigan M. Soc. 27:451 (July) 1928) thinks the dangers of acute *empyema* depend largely upon delay in diagnosis. Before adhesions have formed, repeated needle aspirations of the fluid or, preferably, the air-tight introduction, through a cannula, of a **drainage tube** and a smaller tube for frequent antiseptic irrigations usually suffice in *children*, while in *adults*, as a rule, the **resection**

of ribs is necessary later. The principal cause of a chronic empyema is improper drainage. The drainage tubes should never be removed until the intrathoracic cavity has been entirely obliterated. If under adequate drainage and antiseptic irrigations the cavity fails to close, radical surgical measures, to permit the lung to expand to the chest wall, or to bring the collapsed lung down to the chest wall, are necessary. In 3 cases of *pulmonary tuberculosis* in patients who were not good subjects for thoracoplasty, Alexander obtained good results by combining **phrenicectomy** with removal of the posterior sections of 8 or 9 intercostal nerves, thereby causing respiratory quiet and a certain degree of lung compression and relaxation. For *bronchiectasis* and *lung abscesses*, artificial pneumothorax gives the best results in recent suppuration near the hilum. **Phrenicectomy** is indicated especially for lesions in the lower half of the lung. **Cautery drainage** through the chest wall is indicated for peripheral lesions, and in chronic cases extensive extrapleural **thoracoplasty** or extrapleural **pneumolysis** should be used. For *cancer of the esophagus*, technically satisfactory methods for resection of the cervical or thoracic portions of the esophagus have been worked out and have been used successfully in about 6 cases.

W. Denk (Wien klin Wchnschr 41 1673 (Dec 6) 1928) considers the Sauerbruch-Brauer **thoracoplasty** as a method of choice when pneumothorax is impossible and when there is a unilateral productive form of *pulmonary tuberculosis*. **Phrenicus exeresis** is considered unsuccessful as an independent procedure and is used in the supplementary operation. When the

disease is limited here to 1 upper lobe, **apicolysis** and **packing** alone may be considered. Cavities often necessitate re-operation on the portion of the chest wall which overlies them. Bands which prevent necessary collapse may be divided by the **cautery** through the thoracoscope or by open operation. *Tuberculous empyema* should be treated conservatively by **aspiration**, or if there is mixed infection, irrigations with **rivanol** or **Pregl's solution** are added. If these fail, **Buelau's drainage**, followed by **thoracoplasty**, is indicated. A primary thoracotomy is permissible only when there is ichorous empyema. *Bronchiectasis* should only be treated after exact localization and accurate determination of the extent of the condition, as by the use of lipiodol filling. Only those cases with unilateral lesions in which medical treatment fails should be subjected to operation. **Bronchoscopic treatment** for *foreign bodies* should always be tried, and if there is diffuse *bronchiectasis* involving more than 1 lung, **compression** methods are useful when the cavity walls are yielding. Circumscribed large cavities or complications with abscess or gangrene should be treated by **pneumonotomy**. *Unilateral circumscribed bronchiectasis* limited to 1 lobe is suitable for **lobectomy**, preferably by a two-stage operation. Less dangerous is the **transverse resection** of the lower lobe.

Andrei (Arch ital di Chir (Apr 28) 1929) finds that *simple hemiatrophy of the diaphragm*, involving uniformly the corresponding half of the muscle including costal insertions and the crura, followed permanent interruption of the phrenic nerve. Such atrophy is not associated with fatty

degeneration of muscular fibers but only with a relative increase of the fat of the interstitial connective tissue. The atrophy continues to increase for the first few weeks, is more marked for from 3 to 4 months after section of the nerve, and remains unchanged after 5 months. In the dog, the phrenicus appears to be the only motor and trophic nerve of the diaphragm, following the division of which there is a permanent paralysis of the corresponding half of the diaphragm.

*Resection of the First Rib in Thoracoplasty*—In a complete operation of extrapleural thoracoplasty, the usual procedure is to resect the lower ribs from below upward and then remove the upper ribs in the following order: Fourth, third, second and first. The disadvantage in this procedure, as pointed out by T. S. Moise (*Surg. Gynec. Obst.* 49: 694 (Nov.) 1929), is that after the first rib (the last one to be resected) has been transected posteriorly, there is an immediate collapse, due to the bucket-handle movement of the first rib, with consequent rotation of the ribs downward and backward, as a result of which the cut ends of the ribs swing upwards. This disturbs the originally adequate exposure of the first rib and makes its second section more difficult. This difficulty can be readily avoided if the usual order of resection is altered as follows. The fourth rib is left intact until after the third, second and first rib have been resected. Of course, care should be taken so as to avoid wounding the brachial plexus, the subclavian artery, the superior intercostal vessels, and the dome of the pleura.

**THROMBOSIS AND EMBOLISM.—ETIOLOGY**—The great increase in fatal post-operative pulmonary embolism observed in many clinics during 1927 and 1928 is also reported by P. Martini (*Arch. klin. Chir.* 153: 495, 1928) from the Municipal Hospital of Chemnitz. Of 29,190 patients receiving surgical treatment in this hospital from 1917 to 1928, fatal pulmonary embolism occurred in 66 (0.22 per cent), and of 22,348 patients not operated upon it occurred in 24 (0.10 per cent). In 3193 autopsies, pulmonary embolism was found to have been the cause of 90 (0.81 per cent), and in 66 of these (73.3 per cent) an operation had been performed, in 17 under general anesthesia, 23 under spinal anesthesia, and 26 under local anesthesia. In 14 cases death occurred between the first and fifth day after operation, in 25, between the sixth and tenth day, in 17, between the eleventh and fifteenth day, in 5, between the sixteenth and twentieth day, and in 5, between the twenty-first and thirty-eighth day. In 12 cases the operation was performed on the stomach, in 3, on the colon, in 4, on the biliary tract, in 6, on the kidneys, bladder, or prostate, in 4 the operation was done for appendicitis or peritonitis, in 4, for hernia, in 8, for intestinal strangulation, in 7, for diseases of the female genital organs, in 8, for sepsis, phlegmons and the like, in 2, for empyema, and in 8, for other conditions. In addition to 79 thromboses which led to the formation of fatal emboli, large thrombi which did not cause emboli were found in 87 autopsies.

There was a rapid increase in the incidence in the years 1927 and 1928, and in the medical division of the hos-



pital, 23 per cent of the deaths were due to pulmonary embolism, showing also a gradual increase toward 1928. It was not found that the use of intravenous medication was a factor in this increase. On the other hand, A von Tempsky (*Beitr zur klin Chir* 144 170 (Sept 21) 1928) believes that the apparent increase may be ascribed to better diagnoses rather than an actual increase. Among 1458 laparotomies for carcinoma of the stomach, there were 45 cases of thrombosis and embolism (3.8 per cent). Resection of the stomach was followed by 17 cases of thrombosis and embolism and 5 cases of fatal pulmonary embolism, gastroenterostomy, by 13 cases of thrombosis and embolism and 2 fatal cases of pulmonary embolism, exploratory laparotomy, by 12 cases of thrombosis and embolism, and 3 deaths from pulmonary embolism. Death occurs on an average from pulmonary embolism on the ninth day, the earliest, on the fourth, and the latest, on the twenty-first day after operation. Thrombosis of the lower extremities occurs in only 1 per cent of the cases and more often on the right than on the left, contrary to usual observations. An appreciable increase in pulse rate before the occurrence of thrombosis was noted in 30.3 per cent. Thrombosis of the extremities was not a forerunner of pulmonary embolism. Thrombosis of pelvic veins was discovered at necropsy in 25 per cent of the cases. After 506 operations for cancer of the rectum, there were 27 cases of thrombo-embolism with 17 deaths from pulmonary embolism. Amputation and resection by the sacral route resulted in 23 cases of thrombo-embolism with 15 deaths from pulmonary embolism,

while the operation establishing an artificial anus resulted in 4 cases of thrombo-embolism with 2 deaths from pulmonary embolism. Cases in which amputation and resection were done by the combined method remained free from these complications. Twenty-nine cases of thrombo-embolism and 4 of fatal pulmonary embolism followed 1767 operations for appendicitis, the majority occurring with perforating appendicitis. Thrombosis of the portal vein occurred in 4 per cent of all types of appendicitis and 7 per cent of the acute type. The author, also, does not believe that intravenous injections or operative trauma play any part. No cases of fatal pulmonary embolism occurred after 831 operations for gastric ulcer, but 0.2 per cent followed operations for hernia, restricted, however, to incarcerated hernia. Cachexia and excessive obesity are considered important factors, and infection, of less importance, although it cannot be disregarded.

Ten sudden deaths from pulmonary embolism and 15 cases of pulmonary infarctions after operations upon the urinary tract are reported by H. M. Thomas, Jr., and A. Alyea (*South M J* 22 737 (Aug) 1929). In 8, the infarcts were unexpectedly found on autopsy, 6 of these patients dying from other causes. In 1 there was a general colon-bacillus septicemia. Two cases followed cystoscopy, 8, perineal prostatectomy, 1, retrovesical abscess, 1, nephrolithotomy, 1, after excision of varicocele with the bottle operation. Study of the fatal cases indicated that the embolism nearly always originated in 1 of the femoral veins or its larger trunks. The thrombophlebitis of the pelvic

veins, which occurs in almost every case, rarely yields a fatal embolism. The femoral phlebitis may result from an extension of the process from the pelvic veins, the embolus arising in the femoral vein being usually dislodged before the phlebitis is recognized. Small emboli, which cause merely pulmonary infarcts, seem to come from the pelvic veins. Obese patients about the age of 60 seem to be more susceptible to pulmonary embolism.

**VARIETIES**—Thrombo-embolic disease is divided by K. H. Giertz and C. Crafoord (*Acta chir. Scandinav.* 64 121, 1928) into the following types: (1) Obstructive pulmonary embolism, (2) non-obstructive pulmonary embolism with manifest thrombosis, (3) non-obstructive pulmonary embolism without manifest thrombosis, and (4) manifest venous thrombosis without pulmonary emboli. As to etiology, the disease occurs chiefly in patients who have been operated upon, exceptionally in those subjected to operations on the head and trunk and rarely after operations upon the upper extremities or the chest. Patients with varices, thrombophlebitis in particular, are very likely to develop thrombo-embolism. As a rule, neither the thrombus nor the embolus liquefies. The action is not prevented by raising the foot of the bed or other measures to establish better circulation of the veins of the lower extremities and the pelvis.

**DIAGNOSIS**—While thrombo-embolic disease may be present without clinical signs, as a rule there is subfebrile temperature and less often a certain impairment of the pulse, a typical feature being a subfebrile and febrile arched curve with or without

Mahler's sign, where such changes should not be expected. This occurs almost regularly as a premonitory sign of venous thrombosis as well as of pulmonary embolism. The attack of pulmonary embolism may be ushered in by a stitch-like pain or hemoptysis followed by intense pallor, disappearance of the pulse, and loss of consciousness, often with sense of oppression, air hunger, mild cyanosis, and a typical venous pulsation above the clavicles, indicating spasmodic attempts at contraction on the part of the right ventricle. In 50 per cent of the authors' cases of obstructive emboli, the whole thrombus became detached. Death rarely occurs instantly, and in most cases there is sufficient time to allow a Trendelenburg operation. No prophylactic treatment is known. Localization of the thrombus in the left common iliac vein and its roots, generally considered to be primary, was not clearly borne out in the authors' cases.

**TREATMENT**—A number of recent operations of the Trendelenburg type have been reported. G. Nystrom (*Acta chir. Scandinav.* 64 110, 1928) operated upon 3 patients, all of whom left the operating table alive. A woman of 48, who developed pulmonary embolism after an operation for hemorrhoids, lived for 30 hours. A woman of 45, with embolism after a cholecystectomy, lived for 5 hours. A man of 35 with embolism after an appendectomy was discharged well and has resumed his work. All were operated upon while in the agonal state. In the first, a typical Trendelenburg operation was done, in others, an extrapleural exploration in which an additional resection of the third costal cartilage was found advantage-

ous In 1 case there were small ruptures of the intima of the pulmonary artery on account of the tourniquet having been pulled too tight. The blood stream was cut off in the 3 cases for 60, 65, and 104 seconds respectively. In the last case the embolus was mostly removed by the aid of a **suction tube**. For reviving the heart, **epinephrine** was injected into the aorta in the last 2 cases, with the best results.

C Crafoord (Acta chir Scandinav 64 172, 1928) reports 2 successful operations for pulmonary embolism following Trendelenburg's technic. Interference with the left pleura is not necessary and should be avoided, and after removal of the embolus all vessels of the chest wall should be carefully ligated. The rubber tube around the vascular pedicle should never be pulled tight. Its purpose is merely to pull the artery into the wound. The incision into the artery should be about 2 cm long. The stagnated blood should be let out in order to unload the heart and to evacuate any thrombi that may be lodged in the heart or in the vessels peripheral to the heart. A **suction apparatus** is of great advantage. Crafoord also recommends injections of **adrenalin** directly into the heart or aorta in the efforts at resuscitation.

Three fatalities after the Trendelenburg operation are reported by J de Harven (J de chir et am Soc belge de chir 27 291, 1928). These operations were done 9 to 12 days after various primary operations. The sternal end of the third rib was resected, the pleura pushed away, the pericardium opened, and through an incision in the wall of the pulmonary

artery near the bifurcation a long blood clot was extracted in each case.

Examinations carried out over a period of 4 years upon a patient operated upon successfully by von Kirschner in 1924 are given by H Stegemann (München med Wchnschr 75 1165 (July 6) 1928) who, as he could find no pathogenic findings, concluded that a complete and permanent cure had been obtained.

## LYMPHATIC SYSTEM.— INFECTIONS—LYMPHANGITIS—

*Diagnosis*—A case of primary *lymphangitis of the appendix* is reported by A Borchard (Deutsche med Wchnschr 54 1074 (June 29) 1928). There was an acute onset with chill, fever, moderately severe abdominal pains, particularly on the right side, headache and constipation. Three days later, the abdomen was soft, not distended, there was tenderness in the ileocecal region, slight tenderness of the abdominal wall on the right, low down, and moderate deep resistance. The axillary temperature was 38.8° C (101.8° F), pulse 120, leukocyte count 17,000 with marked shifting to the left. A diagnosis of primary lymphangitis of the appendix was made and the appendix with the adjacent mesenterium and neighboring glands removed. Pathologic examination of the appendix confirmed the diagnosis.

*Treatment*—The differentiation of acute infections of the finger with the production of a felon, acute lymphangitis, or tendon-sheath infection, depends on definite symptoms and signs, readily recognized if kept in mind and sought for. For a *felon*, the infected finger should be opened at the earliest possible moment under

general anesthesia, according to S L Koch (J A M A 92 1171 (Apr 6) 1929) A long lateral incision will suffice, provided it crosses the palmar surface so as to divide the fibrous septa that pass from the skin vertically to the periosteum The incision should not extend upward far enough to invade the sheath of the deep flexor tendon at its insertion on the base of the distal phalanx The horseshoe-shaped incision, so frequently advocated, is unduly long in healing and leaves a painful scar over the finger tip and an anesthetic area distal to the scar It is, therefore, not advised With an early incision, curettage or excision of the bone are unnecessary Wedges of petrolatum gauze should be so introduced into the wound as not to interfere with drainage, and a hot wet dressing used until the infection is under control With *acute lymphangitis*, rest in bed, hot wet dressing from the finger tips to the axilla, and the avoidance of any active surgical treatment are important To cut into the finger before definite localization of the infectious process has occurred is to court almost certain disaster If conservative measures do not bring about an arrest of the infectious process, surgical intervention will only hasten a fatal outcome The characteristic signs of *tendon-sheath infections* are pain and swelling of the entire finger, with the swelling more pronounced in the dorsum of the finger and tenderness over the anatomical position of the tendon sheath The patient holds the finger semiflexed, and any attempt to flex it causes severe pain Successful treatment depends upon a correct diagnosis early in the course of the infection.

**CERVICAL LYMPHADENOPATHY**  
— *Diagnosis* — Ninety patients who sought treatment because of enlargement of the cervical lymph nodes are considered by D C Elkin (J A M A 93:146 (July 13) 1929) Of these, 50 were classified as having primary lymphatic neoplasms In the remaining cases, the enlargement was due either to infections or to malignant metastases In nearly half, the provisional diagnosis disagreed with the final pathological diagnosis The diagnosis of *tuberculosis* was the most difficult, largely because other conditions, such as Hodgkin's disease and lymphosarcoma, were incorrectly considered as tuberculous Other lymphatic diseases often present the same characteristics, and unless there is lung involvement or chronic suppuration of the nodes only a microscopic section will establish the diagnosis In 15 cases of *leukemia*, the enlarged cervical nodes were the first noticed in about half of the cases In 7 cases of *lymphatic leukemia*, the first complaint was of the presence of enlarged cervical nodes In 4 of 8 cases of *Hodgkin's disease*, the cervical nodes were the first involved Of 15 patients with *lymphosarcoma*, the cervical nodes were first involved in 11 In 2 cases, the disease was rapidly fatal, but in 1 it has remained localized in the neck for 5 years and has responded rapidly and favorably to treatment

Localized enlargements of the lymph glands are usually the result of local infection, perhaps from a trifling wound, conveyed by the lymphatics The local enlargement of the glands of the neck may be metastatic from an internal carcinoma or the beginning of a Hodgkin's dis-

ease Generalized enlargement may be due to an infection such as rubella or syphilis or an acute lymphatic leukemia The patient with chronic *lymphatic leukemia* may consult the physician for swelling on 1 side of the neck In *lymphosarcoma*, the glandular masses can be unequal in size, rather hard, and definitely fixed to the deeper tissues A E Gow (Brit M J. 2 972 (Dec 1) 1928) reports a case of lymphosarcoma in a woman of 20 years, which was apparently cured by x-ray irradiation In this disease, the glandular groups tend to be unequal in size, rather hard, and definitely fixed to the deeper structures

**LYMPHADENOPATHY OF THE CHOLEDOCHUS** was found by A Most and J Severin (Beitr z klin Chir 145 613 (Feb 2) 1929) in a patient whose history and symptoms led to a diagnosis of duodenal ulcer Operation was performed, but ulcer was not found, in fact, except for a slightly enlarged gall-bladder, free from adhesions, nothing was found until the search was extended to the common bile duct, where the lymph nodes were found to be considerably enlarged and were removed with complete recovery Microscopical examination showed only hypertrophy of the nodes

On the basis of histories of a number of families, G B Savelli (Riv di clin pediat 26 172 (Mar 15) 1928) believes that there is a hereditary transmission of exudative lymphatic diathesis

**INTRATHORACIC TUBERCULOUS LYMPHOMA** — *Diagnosis* — Of 5 patients reported by H Wessler (Am Rev. Tuberc 17 574 (June) 1928), the patients were all young adults

and, with 1 exception, females The symptoms were fever of moderate degree, weakness and loss of weight, and such less common evidences of toxemia as purpura hemorrhagica and rheumatic pains There was enlargement of the mediastinal lymph nodes which, in some of the cases, were of massive proportions The duration of the symptoms was from 2 to 6 months and in 1 case, 3 years Striking features of the affection were the practically exclusive involvement of the intrathoracic nodes with their extreme hyperplasia

**NEWGROWTHS — CANCER — Treatment** — As all of the cervical glands are enclosed in a sheath of cellular tissue, they can be removed *en bloc* by finding the anatomical planes of cleavage which lie in the spaces that separate the muscles from the perimysium and the vessels and nerves from their adventitia In cases of cancer, removal of the glands should be very extensive, even when they are apparently normal Recurrence of cancer of the mouth and pharynx is generally not a true recurrence but the development of a latent adenopathy With a submaxillary excision, the *submental* space should be cleaned and the carotid chain dissected in the space extending from the posterior digastric to the middle tendon of the omohyoid Removal of the carotid chain of glands should extend to the clavicle, sacrificing the sternocleidomastoid, and terminating at the trapezius

R Bernard (J de chir 30 241 (Sept) 1927) for anesthesia, prefers the administration of ether by rectum or chloroform by Delbet's pipe Many American operators find the use of narco-local anesthesia very efficient

Morestin's large stellate incision is useful. However, **submaxillary excision** or complete **cervical excision** may be used. The submaxillary operation consists of liberation of the maxilla, cellulotomy, beginning along the lower border of the maxilla, liberation of the parotid, exposure of the posterior belly of the digastric, dissection of the anterior digastric and the submental region, dissection of the anterior digastric and the submental region, dissection of the mylohyoid, ligation of Wharton's duct and the facial artery, dissection of the omohyoid, liberation of the sternocleidomastoid and spinalis, dissection of the internal jugular, ligation of the thyrolinguofacial trunk, dissection of the hyoglossus, and ligation of the external carotid. In total excision of the cervical glands, the sternocleidomastoid must be sacrificed whether the glands are adherent or not. The sacrifice of this muscle does not involve any loss of function. The dissection is carried back to beneath the anterior border of the trapezius and terminated at the hyoglossus as in the preceding operation. Even this extensive procedure requires only about three-quarters of an hour if it is not complicated by adhesions. Generally it is well borne by the patient, in spite of its severity, and the wound heals by first intention.

D. M. Blair (*Brit. M. J.* 1:441 (Mar. 9) 1929) describes the lymphoid tissue occurring within the capsule of the submaxillary gland which is in direct relation to the salivary acini. Because of this tissue, it is impossible to be sure of removing all submaxillary lymph glands without removing the submaxillary gland itself. Blair believes that these glands may be re-

sponsible for the occurrence of cancerous metastases in the salivary glands and may be the sign of a tuberculosis, apparently primary, in the submaxillary glands.

**LYMPHOEPITHELIOMA**—The particular form of epidermoid carcinoma of the nasopharynx, designated by C. Regaud and A. Schmincke as lymphoepithelioma, occurs at all ages but especially between the ages of 30 and 60 years. It arises from modified epithelium overlying lymphoid tissue in the tonsils, base of the tongue and nasopharynx. The tumors grow slowly, remain small locally, and are often overlooked, but tend to produce early metastases to the cervical lymph nodes, and later, widespread extensions to liver and bone marrow, and are generally fatal.

J. Ewing (*Am. J. Path.* 5:99 (Mar.) 1929) notes the difficulty of distinguishing between a lymphosarcoma on the one hand and a transitional-cell carcinoma on the other, except by the structure which shows sheets of pale-staining epithelial cells often in syncytia and infiltrated with many lymphocytes, both in the primary tumor and in metastases. The clinical appearance, the course, location and radiosensitivity does not differentiate them from other tumors of the same region. Anaplastic carcinomas may be distinguished by their more rapid course and cellular structure. Since different writers have included under the term "lymphoepithelioma" various tumors, such as transitional-cell carcinoma and Schneiderian carcinoma, the exact definition of the tumor cannot as yet be made.

**LEUKOSARCOMA**—*Pathology*—A case in which a primary retroperitoneal lymphosarcoma apparently ter-

minated with leukemia is reported by D H Flashman and S S Leopold (Am J M Sc 177 651 (May) 1929) A man aged 60 had a swelling in the right inguinal region for 12 months, showing at biopsy lymphosarcoma After several months of x-ray treatment, he developed leukemia, the white-cell count rapidly increasing to 444,000 cells per cmm and from 90 to 96 per cent of small lymphocytes at the time of death Necropsy showed not only the invasive lymphosarcoma in the inguinal and retroperitoneal regions but an extensive involvement, resembling leukemia, of most of the lymphoid system, the liver, spleen, and bone marrow of the right femur, and the metastatic nodules in most of the organs Large lymphoblasts and small lymphocytes with intermediate types were found in the tissues, and the patient is believed to have had an intermediate type of the disease

**LYMPHOBLASTOMAS** —Twenty cases of lymphoblastoma, 10 with autopsy, were studied by H L Keim (Arch Dermat and Syph 19 533 (Apr) 1929) The clinical pictures are multiple, and various clinical types present interchangeable pathological observations The constant pathologic condition in all is a cell of the lymphocyte series Until a distinct etiology is determined, Keim feels that the term "lymphoblastoma" would seem to be justified on the basis of the genetic relationships existing between the various members of this group

*Basal Metabolism* —From a study of 30 cases of lymphoblastoma, I C Krantz (Am J M Sc 176 577 (Oct) 1928) concludes, exclusive of chronic lymphatic leukemia, that the basal

metabolism is usually elevated, not only in chronic lymphatic leukemia but also in other types of lymphoblastoma when the disease becomes widespread The elevated basal metabolism, the associated symptoms, and untoward manifestations may be reduced by the proper application of **x-rays** and **radon**. Leukopenia is not a contraindication to irradiation therapy in cases which have an increased basal metabolism

#### **PERIOSTEAL LYMPHATICS.**—

A definite plexus was found by R Campbell (Arch Surg 18 2099 (May) 1929) in the periosteum and perichondrium at the costochondral junctions of certain animals The plexus exists largely in the outer layer of the periosteum and is drained by valvular vessels which accompany the blood-vessels Within the plexus there are few, if any, valves, the vessels being freely communicating Lymphatics are thought to have been traced down to the epiphyseal line but could not surely be traced from the periosteum into the cortex

#### **PERITONEAL LYMPHATIC ABSORPTION**—K P Brown (Brit J Surg 15 538 (Apr) 1928) con-

ducted a series of experiments to determine the value of *lymphaticostomy* In rabbits, absorption takes place very rapidly by the lymphatics of the upper abdomen and especially by the diaphragm The main path of absorption is the thoracic duct, the retroperitoneal lymphatics playing a subsidiary part In cats and dogs, absorption by the thoracic duct from the peritoneal cavity is a very slow and unimportant process The function of the duct is to drain the chyle from the intestines The internal mammary lymphatics drain to the

anterior mediastinal glands. The omentum has only a small, if any, part in the lymphatic absorption from the peritoneal cavity. The paths of lymphatic absorption in cats and dogs are in certain respects similar to those of man. Therefore, lymphaticostomy cannot be recommended as a procedure holding out any hope to patients suffering from acute peritonitis.

**REGENERATION OF AUTOPLASTIC LYMPH NODE TRANSPLANTS.**—From experiments in which whole lymph nodes were transplanted into the abdominal wall of the albino rat, H. L. Jaffe and M. N. Richter (*J. Exper. Med.* 47: 977 (June) 1928) found that the transplants persisted in the muscles of the abdominal wall as a fully developed lymph node. The necrosis following transplantation involved mainly the lymphocytes which were preserved only at the periphery. The reticulum cells played an important part in the regeneration of the lymph node, and for the most part did not degenerate. In the regeneration of the node, the marginal sinus and the hilus apparently regenerated from the same structures in the transplant. Through the marginal sinus an important means was probably preserved for lymphatic communication with the surrounding tissues. The hilus of the regenerated node became the site of entry of the blood-vessels.

**STATUS LYMPHATICUS.**—The skepticism shown in recent articles as to the existence of an unfavorable or fatal influence of a persistent thymus is combated by G. M. Slot (*Brit. M. J.* 1: 450 (Mar. 9) 1929), who considers the post mortem findings in

status lymphaticus quite definite, including enlargement of the thymus, hyperplasia of the glandular tissue at the base of the tongue, usually some excess of the tonsils and oral lymph tissue, and hyperplasia of the lymphatic tissue of the gastro-intestinal system, the stomach having a characteristic "sago-like" feel. There was also usually enlargement of the abdominal lymphatic gland. The author believes that the real cause of death in status lymphaticus is not yet known.

Two cases of status lymphaticus are reported by P. M. Zeek (*Arch. Path.* 6: 1058 (Dec.) 1928), in which the cause of death was cerebral hemorrhage, resulting from hypoplasia of the cerebral vessels. The thinness of the vessel walls is accounted for by deficiency in the muscular layers, there being no decrease in the thickness of the intima and adventitia. A corresponding decrease in the musculature in the vessels of other organs than the brain was not observed.

**LYMPHOCYTOSIS.**—Lymphocytosis, relative and absolute, has claimed much attention for many years without having had a consistent significance except in leukemia. K. R. McAlpin (*New York State J. Med.* 28: 1103 (Sept. 15) 1928) states an increase in lymphocytes is found in lymphatic leukemia, mononucleosis or glandular fever, exophthalmic goiter, tuberculosis and occasionally in generalized carcinoma. A relative increase occurs also in typhoid fever, malaria, syphilis and pernicious anemia. No writer has claimed any great specificity for the condition.



## M

**MAGNESIUM.—PHYSIOLOGICAL ACTION**—The biologic actions of the halogen salts of magnesium have been described by Pierre Delbet (M Press 128 47 (July 17) 1929) Eleven guinea-pigs were fed on a diet deficient in antiscorbutic vitamins Five were magnesiated hypodermically and parenterally The control group on the average lived 9 days, the magnesiated group 16 days A further experiment with mice fed on a diet deficient in vitamins A, B and C, gave similar results The average survival here was 19½ days for the controls, and 28 days for the magnesiated ones, leading to the conclusion that halogen salts of magnesia have a favorable effect on general metabolism

E Chabrol and M Maximin (Bull et mém Soc méd d hôp de Paris 52 1693 (Dec 13) 1928) report on the inhibiting action of magnesium sulphate on the liver secretion of bile In experiments on dogs the gall-bladder was excluded by ligation of the cystic duct and 0.15 mgm of magnesium sulphate per kilo of body weight was injected intravenously The amount of bile, which had varied from 7 to 8 cc per half hour, quickly fell to 3 or 4 cc in 2 hours Its inhibiting effect was also shown in dogs which had been given bile salts and atophan 4 hours after the magnesium sulphate injection The very strong cholagogue action of the bile salts and atophan was completely inhibited Magnesium sulphate inhibits the action of bile salts and atophan also when it is given after their administration

**THERAPEUTICS**—Magnesium has been found useful in infections of the biliary passages A case is reported of a man who had repeated attacks of **cholecystitis** and **angiocholitis**, painful and persistent intestinal attacks (diarrhea, meteorism, painful spasms after eating, etc) Strict diet, diathermy and infra-red rays had failed to relieve him He placed himself on magnesium chloride, 2 tablets, *ie*, 12 Gm (19 grains) daily, and stopped all other medication These results were given in the patient's own words "No more hepatic crises, no more pains in the region of the epigastrium, the intestinal trouble improved After a few weeks stools became normal, for the

first time in 5 months In 2 months the gain in weight was 10 kilos (22 pounds) Normal appetite, easy digestion in spite of returning to a much less stringent diet Able to resume my usual occupations without the slightest fatigue"

The effect on the stools is one of regularization, relieving constipation, or reducing the stools in diarrhea This effect is supposed to be the result of stimulation of bile secretion A further effect of regular and continued absorption of magnesium chloride is the deodorization of the feces Since  $MgCl_2$  is not an antiseptic, this action is probably due to a modification of the epithelial cells and their secretions, *ie*, to a cytophyllactic action

Delbet (*ibid*) feels that many nervous troubles are due to magnesium deprivation The sensation of **fatigue**, of **asthenia**, etc, which sometimes occur without apparent cause, disappear under the influence of magnesium chloride This salt gives calm and energy with a sensation of euphoria and optimism Magnesium also exercises good effect on **muscular stiffness** in its various forms It has been found to act on certain pathologic tremors. In **Parkinson's disease**, the intention tremor is greatly alleviated It is said to relieve the painful contractions which are termed "**cramps**" Its action on certain forms of pruritus has been most encouraging A definite pruritus of senile type disappeared completely in a few weeks When the magnesium was suppressed it occurred again at the end of 5 days It disappeared again after the salt had been taken for several days Pruritus due to chronic icterus has been relieved "**Washerwoman's eczema**," with itching is greatly benefited by magnesium Magnesium chloride has been found to cause the warts of adolescents to disappear

**MALARIA.—ETIOLOGY**—Studying congenital malaria, A G Alarcon (Bull Soc de pédiat de Paris 26 52 (Jan) 1928) found the *Plasmodium vivax* in the blood of 1 child 40 hours after birth, and in another child in 96 hours after birth Since

the incubation period of malaria is 8 days, this convinced him of the congenital form of the disease

**PATHOLOGY.**—G A Piana (Climediat 10 732 (Nov) 1928) shows that in the presence of malaria there is a tendency toward the creation of a constitutional habitus of a type that favors the evolution of lung disease. There is at the basis of this condition, according to Piana, a profound alteration in the metabolism and also of the ductless glands

K E Surbek (Arch f Schiffs- u Tropen- Hyg 33 461 (Sept) 1929), studying the adult hospital patients, noted a marked difference in the frequency with which enlargement of the spleen could be demonstrated clinically in tertian malaria and in tropical malaria. In the former the spleen was palpable in 64 per cent of cases, while in the latter form it was palpable in only 30 per cent of the cases. Thus he believes that in regions infected with the tropical form the plasmodium index should always be determined regardless of the result of the determination of the spleen index

**COMPLICATIONS.**—A Fiorentini (Polichinico (sez med) 36 520 (Oct) 1929) had occasion to observe 2 cases of sciatic neuritis and 1 of sciatic neuralgia due to malaria provoked respectively by the estivo-autumnal parasite and by the benign tertian parasite. He believes in many instances a sciatic neuritis may be produced by the injection of quinine in proximity to a nerve

G J Perekropow (Arch f Schiffs- u Tropen- Hyg 33 432 (Aug) 1929) reports the case of a girl aged 19 years, in whom the presence of a severe secondary syphilis was followed by the dis-

appearance of the typical attacks of tertian malaria. The patient was undergoing no specific medication for the malaria but following the development of the secondary lesions, there was never a malarial parasite found in the blood. Thus on the basis of this and 2 other cases, the author believes the benefit derived from the use of malaria in the treatment of paresis is not attributable to the action of the parasites, but the combined treatment with arsphenamine and quinine

**TREATMENT.**—R Ullman-Apostolon and G Apostolon (Presse méd 37 1137 (Aug 31) 1929) present their findings in treating hundreds of cases in Macedonia. They gave intravenously large doses of **sodium cacodylate** (from 1 to 2 Gm—15 to 30 grains) associated with a subcutaneous injection of **strychnine sulphate** (2 mgm— $\frac{1}{32}$  grain), during the first 10 days of the treatment they also gave **quinine sulphate** (from 15 to 20 Gm—23 to 30 grains) daily by mouth. The only disturbance which they encountered was a diarrhea in about 15 per cent of cases. In from 3 to 5 per cent of cases a parotitis developed, but the authors consider this form of treatment far superior to splenectomy, as not only the attack but the entire course of the disease was modified

J A Sinton and W Bird (Indian M J Research 16 725 (Jan) 1929) believe that the use of **quinine** and **alkalis** seems to be more efficacious than quinine alone in curing the fresh infections, but the results in the chronic cases did not show any marked benefit. The 4 crystallizable alkaloids of cinchona bark, **quinine**, **quinidine**, **cinchonine** and **cinchon-**

dine, showed almost an equal value in preventing a relapse in the chronic infections. Quinidine gave the worst result. No evidence was found to confirm the opinion that quinidine was more effective than the other alkaloids in the treatment of infections with *Plasmodium vivax*.

P. H. Manson-Bahr (Lancet 2: 496 (Sept. 8) 1928) believes strongly that **plasmochin** can act as an efficient substitute for quinine in patients who have been susceptible to, or intolerant of, large doses of the latter. It is frequently tolerated in severe cases with persistent vomiting when quinine is not, and the amount of the drug necessary to banish the parasites from the blood is much smaller. The taste is not disagreeable and there is no pronounced gastro-intestinal disturbance. Occasional signs of relative intolerance to the drug develop in the form of slight cyanosis, dyspepsia, colic and splenic pain.

B. Nissenbaum (Wein. k. Wchnschr. 42: 300 (Mar. 7) 1929) administered daily doses of 0.06 to 0.1 Gm (1 to 1½ grains) which were effective. These amounts were given for 5 days, followed by a period of 1 week without drug therapy. The duration of the treatment was 6 to 7 weeks. To the author, **plasmochin** is the first known preparation capable of destroying the gametes of tropical malaria. In cases of quinine idiosyncrasy, quinine resistant malaria, and pregnancy, **plasmochin** has efficiently replaced quinine.

**MALARIA-THERAPY.**—J. Wagner von Jauregg (Wein. med. Wchnschr. 78: 275 (Feb. 25) 1928) states that the malarial treatment of positive spinal fluid in late lues, seems to be a valuable prophylactic measure against metaluetic diseases.

The best results are obtained in progressive **tabes**, with or without a positive reaction. This is again true for apparently stationary **tabes** with a positive reaction. The tertiary malarial form is employed, and several cubic centimeters of blood, from a malarial patient are injected intramuscularly or subcutaneously. After the desired number of fever attacks have been obtained, 5 Gm (1¼ dram) quinine are given internally, within 5 to 7 days. In those cases endangered by age or weakness, the malaria can be interrupted after 2 to 4 fever attacks, and, after a rest period of 6 weeks with neosalvarsan treatment, it can be inoculated anew. The value of the therapy for the secondary luetic has not been decided. In treatment of genuine early and late syphilitic diseases of the nervous system, the author doubts the efficiency of malaria therapy and advises the use of specific treatment, eventually in combination with vaccine and protein body therapy.

**MECHANISM OF INOCULATION-MALARIA.**—W. L. Brutsch and M. A. Bahr (J. N. and Ment. Dis. 67: 209 (Mar.) 1928) report on the necropsy done on a patient suffering from general paralysis who died about 1 week after intravenous inoculation of 15 cc (24 minims) of malarial blood. During the paroxysms or the treatment microscopic changes are produced in the brain. These consist of proliferative phenomena of the capillary endothelium, which must be regarded as a part of the reaction of the reticulo-endothelial system. The reaction of the reticulo-endothelial system in inoculation-malaria is as intensive as in typhoid, following which disease similar good results in general paralytic patients have been frequently reported. The absence of the perivascular infiltrations in the greater part of the cortex in a patient who died at the height of a paroxysm toward the end of the course of therapeutic malaria suggests the disappearance of the infiltrating cells during the acute malaria. During the course of malaria and particularly at the time of the febrile attacks, plasma cells probably immigrate into the brain vessels taking part in the phagocytosis of the liberated young plasmodia. After the retrogression of the perivascular infiltrations, normal conditions are

reestablished in the perivascular lymph spaces, resulting in a partial recovery of the ectodermal tissue (ganglion and cells)

**INDICATIONS**—G Stumpke (Deutsche Wchnschr 55 865, (May 24) 1929) points out that in various forms of *metasyphilis*, particularly in *paresis*, malaria therapy has brought good results. In recent years its use has been extended to *gonorrhea*. The author advises that it should not be used without discrimination, because it involves great dangers. The mortality is comparatively high, the infectiousness of malaria cannot be entirely disregarded, and it is often difficult to check the malaria. Malaria therapy should be limited to cases of *paresis* and *refractory cerebrospinal syphilis*.

**MALNUTRITION**.—In a study of 400 malnourished children, H H Perlman (M J and Rec 130 148 (Aug 7) and 197 (Aug 14) 1929) reported that 69 per cent were 7 per cent under average weight, 12.75 per cent were 10 per cent undernourished and 8.5 per cent were 15 per cent or more undernourished. Malnutrition was present in about equal numbers of boys and girls. There were more instances of poor nourishment among children aged 8 years than at any other age, possibly due, the writer suggested, to convalescence from recent illness, to over activity or indiscretions of diet. He found malnutrition more marked in the summer months than in any of the other seasons of the year. No correlation between the nutrition of the parent and the malnourished condition of the child could be discovered, but it was apparent that most children who were markedly underweight had physical defects, an improperly balanced diet, or insufficient rest. The outstanding physical defects among the group of 400 were, in order of frequency, dental caries, cervical

adenitis, diseased tonsils and adenoids, secondary anemia, poor posture and defective vision.

The relation between malnutrition and nervousness was demonstrated by M Seham and G Seham (Am J. Dis Child 37.1 (Jan) 1929). With a pedometer, they measured the activity of 10 rats who were given insufficient amounts of food. The activity of the malnourished rats was generally greater than that of a control group. They also noted that immediately following periods of increased activity, rats lost weight. When the underweight animals received food, their symptoms of restlessness disappeared as their weight increased. In a clinical investigation of children who were 10 per cent or more underweight, they found that symptoms of nervousness and fatigue were common. Forced rest periods for 3 such patients resulted in gain in weight and a diminution of the severity of the symptoms.

**MASSAGE**.—Kovindjy (Revue Gén de Clin et de Thera 42 330 (May 19) 1928) found that by combining the actinic action of the arc lamp with the mechanical and reflex action of massage, he not only got better results but could cut the time of exposure in half. The lamp is placed about 30 cm from the area to be treated. White linen gloves are used to protect the hands of the masseur. In *actino-massage* the patient should never be exposed to the action of the rays for more than 10 minutes. Actino-massage is indicated in the treatment of *arthritis*, *neuralgia*, *sciatica*, *lumbago*, *myalgia*, *obesity*, *rickets* and *atonic wounds*. It is contraindicated in skin diseases, cancer and tuberculosis. Mercury vapor lamps are unsuited to this treatment because they give the patient a cadaverous appearance which makes it impossible to control the results of the treatment.

A gynecological use of massage has been

reported by von Liebermann (Med Klin 24 1749 (Nov 9) 1928) **Pelvic adhesions and displacements** may cause **pains** along the intrapelvic course of the obturator nerve and the branches of the sacral plexus. These conditions cannot be cured by treating only the pelvic organs, but by supplementing the more usual forms of treatment by a type of gynecological massage.

**MASTOIDITIS.**—The mastoid cells, being a part of the middle ear, always suffer in some degree when an infection is present in the tympanum. The importance of this fact is better appreciated in infants and young children where the antrum is often only in microscopic communication with the tympanum. A middle ear infection therefore in an infant often goes on to involvement of the antrum with the pus more or less sealed in that cavity. It either breaks through into the tympanum and drains out by way of a perforated drum, or it produces destruction of the very thin lateral bony plate covering the antrum, with the formation of a subperiosteal abscess.

In infants who have severe gastrointestinal intoxication, the ears are frequently overlooked as a possible etiological factor. J B Sidbury (South M J 20 713 (Sept) 1927) reviews 40 surgically treated cases of mastoiditis in infants. Twenty of these cases presented a picture of acute intestinal intoxication. The primary examination of the ears was frequently negative. Repeated examinations demonstrated a gradual loss of normal luster of the drum with marginal injection. Invariably there was some sagging of the posterior superior canal wall.

According to G Canuyt (Arch internat de laryng 34·276 (Mar) 1928),

of the many sudden deaths of infants after mastoid operations, autopsy does not show any lesions to account for the deaths. In his opinion, there are 3 possible factors in the fatal outcome: General anesthesia, shock, and septicemia. Since March, 1924, Conuyt has operated by large and systematic myringotomy under local anesthesia of the skin of the mastoid region induced with a jet of ethyl chloride. The incision of the retro-auricular abscess is made by the technic used for opening an abscess in general. Simple drainage is established and no curettage is done. In short, the amount of surgery is reduced to a minimum. In 25 cases in which this method was used there were no deaths.

M Berger (Ann Otol Rhin and Laryng 38 275 (Mar) 1929) calls attention to spasm and rigidity of the upper third of the M Sternocleidomastoideus as frequent symptoms of mastoiditis. This finding is present especially in children and in adults whose mastoid cortex is thin or whose mastoids have been perforated. Spasm and rigidity are found only when the mastoid cells have undergone necrosis, and the suppurative process has extended downward. The symptom is elicited best by gently palpating with the fingers of both hands, and comparing both sides. It is only of significance when present.

O J Dixon (Ann Otol Rhinol and Laryng 37 1154 (Dec) 1928) points out the observation of scalp tenderness frequently as the chief complaint of patients with acute mastoiditis. According to him, the symptom is of value (1) As an indication for exposure of the dura of the middle fossa at operation, (2) as assistance

in selecting the most extensively involved ear in bilateral mastoiditis, (3) as an additional indication for mastoidectomy, (4) in the diagnosis and drainage of an extradural abscess, and possibly in the prevention of this complication

I Friesner and S Rosen (Arch Otolaryng 7 317 (Apr) 1928), after examining the pus from discharging mastoid infections for calcium, found that the amount of calcium present ran a close parallel to the clinical observations, indicating the necessity for either operative procedure or expectant treatment. They found a high calcium content in the pus in those cases in which necrosis of bone was present. This procedure has helped them make decisions in cases which were clinically doubtful, especially mastoid infections.

The x-ray in mastoid disease has become a very important part of our diagnostic armamentarium. According to H K Taylor (Am J Roentgenol 19 522 (June) 1928), pathological changes in the mastoid manifest themselves by variations in density, the absorption of the bony trabecula and erosions of the tegmen and sinus wall. Slight variations in density may be due to edema or other conditions of the soft tissues adjacent to the mastoids. When marked clouding is noted this points to the presence of an exudate and granulations within the cells. Extreme clouding usually indicates new bone formation or sclerosis. He further states that cholesteatomata are manifested by destructive and productive changes indicated by dense linear shadows surrounding radiolucent shadows.

L E White, Jr (Arch Otolaryng 8. 32 (July) 1928) states that a radical

mastoidectomy is successful when it prevents intra-cranial infection, stops or lessens aural discharge and offensive odor, relieves headaches and vertigo and preserves the hearing. He found in an analysis of the end-results of 100 unselected cases, that the procedure is largely successful. The poorest results occurred in cases in which the discharge had existed for less than a year, and that the most favorable results were seen in those cases with a discharge of from 5 to 15 years' duration.

**MEASLES.—MORBIDITY**—The age incidence of measles is influenced by housing conditions, according to J L Halliday (Med Research Council, London, 1928). In Glasgow where many families are crowded together in tenements, the majority of children contracted measles in their pre-school years. In Birmingham and in country districts, families as a rule live in individual houses and there measles was most common among children aged 5 to 10 years. The age incidence is important because mortality from measles is 3 to 4 times greater at the age of 3 or 4 years than at 5 to 10 years, is 8 to 10 times greater at 2 to 3 years and 10 to 20 times greater under the age of 2 than at 5 to 10 years.

**ETIOLOGY**—N S Ferry (Am J Dis Child 37 573 (Mar) 1929) reported the agglutination of his "streptococcus morbilli" by human convalescent serum from 86.7 per cent of 83 cases of measles. He asserted that this is a higher percentage of agglutination than that reported for any other micro-organism claimed to be the cause of measles and is further proof of the specificity

of his strain of streptococcus. He has presented evidence that this streptococcus produces a soluble toxin which gives skin reactions only in persons who have not had measles and is ineffective when convalescent measles serum is added to it. An antitoxic serum obtained from horses that had been injected with the toxin, protected susceptible exposed persons from the measles.

**DIAGNOSIS**—G F Abercrombie (Brit J Child Dis 26 15 (Jan-Mar) 1929) employed the term "illness of infection" to describe certain early symptoms in patients with measles. Within a few hours after exposure they developed a catarrh of the nose and eyes accompanied by fever and occasionally by a slight rash. These symptoms disappeared after 3 or 4 hours and 2 weeks later a typical attack of measles occurred. H Jacobs (Nederl Tijdschr v Geneesk 2 3914 (Aug 11) 1928) described similar catarrhal reactions in his patients.

**PATHOLOGY**—Definite cell inclusion bodies have been discovered by B Lipschutz (Wien klin Wchnschr 41 365 (Mar 15) 1928) in the skin of patients with a measles rash. Measles produced in monkeys also had these cell changes. Other effects of the measles virus were swelling and vacuolation of the epithelial cells, perivascular infiltration and cell proliferation, and inflammatory changes in the corium.

G Roi (Pediatria 36 355 (Apr 1) 1928) reported a diminution in the cholesterol content of the blood during measles. A return to the normal amount accompanied convalescence.

The pathologic changes in the lungs during the course of measles

were studied by J L Kohn and H Koiransky (Am J Dis Child 38 258 (Aug) 1929). Roentgenograms of 131 patients were taken every 2 or 3 days beginning in the pre-eruptive stage and continuing through convalescence. The lungs of 20 per cent of these 131 patients were normal, in 74 per cent there were large and dense hilar shadows. In 35 patients the hilar shadow increased and decreased in size during the course of the disease. Infiltration of the lung appeared more frequently among children under 4 years of age than in those over that age. It took the form of large triangles and large opacities near the hilum or disseminated mottling, especially at the cardiophrenic angles. There was no constant correlation between physical signs and the roentgenologic findings. In 47 per cent of those patients who had clinical signs of bronchial and pulmonary involvement, the roentgenograms showed lung pathology. As a rule the pneumonic opacities occurred at the height of the rash and the fever, but the lesions in 27 cases continued to progress after the temperature declined.

**COMPLICATIONS**—A review of the nervous complications of patients suffering from measles was made by F R Ford (Bull Johns Hopkins Hosp 43 140 (Sept) 1928), who claimed that these occurred in 0.4 per cent. Among 113 such patients reported in the literature and 12 more of his own he noted that the most common symptoms of the onset of the complications were a secondary rise in fever, drowsiness, convulsions and stupor. They occurred usually from the fourth to the sixth day after the initial fever had fallen to normal.

The prognosis for life is good but 65 per cent developed some residual symptom such as weakness, mental defect, ataxia or mental disturbance

**TREATMENT.**—Human convalescent serum is still considered the most valuable method of treatment and prophylaxis by the majority of observers. Because of the scarcity of supply, serum from adults who have had measles 2 to 25 years previously, has been employed extensively. G B Bader (J A M A 93: 668 (Aug 31) 1929) gave whole blood in doses of 20 to 30 c c ( $\frac{2}{3}$  to 1 ounce) intramuscularly to 30 children, 6 to 42 months of age, during the first 7 days after their exposure. Twelve did not develop measles, 9 had mild attacks without catarrhal symptoms and 8 had only mild catarrhal symptoms. One had a typical attack.

C Leiner (Wien klin Wchnschr 42 295 (Mar 7) 1929) also found human convalescent serum much more effective in the treatment and prevention of measles than the animal serums. He used blood from adults who had had measles in childhood but found it only 50 per cent as effective as serum from recent convalescents.

L J Halpern (J A M A 90 1109 (Apr 7) 1928) used serum from goats injected with the micro-organism described by Tunnichiff. Sixty-three per cent of those children injected within 4 days of exposure escaped the disease and the remainder had light attacks.

A L Hoyne and S Peacock (Am J Dis Child 35 1021 (June) 1928) protected 43 exposed persons from measles with 10-c c ( $2\frac{1}{2}$ -dram) doses of immune goat serum given within

4 days of exposure. When administered 5 days or more after exposure 81.5 per cent of 138 persons developed mild attacks. Five per cent of the treated group had complications, as compared with 40 per cent of a group of 27 untreated patients.

Similar results with the use of antiserum from horses injected with the streptococcus morbilli of Ferry have been reported by N S Ferry, E J Gordon, F W Monro, A H Steele and L W Fisher (J A M A 91 1277 (Oct 27) 1928). With 2 injections of 10 or 20 c c ( $2\frac{1}{2}$  to 5 drams) they have protected 66 per cent of children exposed to measles.

**MEDIASTINUM.**—The principal lesions which may occur in the mediastinal spaces are (1) infections of lymph glands, connective tissue, thymus, blood-vessels and the tubular viscera which traverse the mediastinal spaces, (2) tumors and (3) cysts. Wagner (Ann Surg 87 511 (Apr) 1928) reports a case in which there was an abscess in the posterior mediastinum following a suppurative arthritis in the cervical vertebral column. With the aspirating needle, pus was obtained from the posterior mediastinum and on rib resection a liter (quart) of purulent material was evacuated. Following this procedure, the patient's temperature fell to normal and the general condition improved. From a review of the literature of the same pathological condition, Wagner maintains that mediastinal suppurative processes are rare, but that when they do occur they are serious complications and usually prove fatal. According to this writer there is no other thoracic condition which is so difficult to diagnose. The



roentgenographs are not infrequently perplexing to interpret and the pain of which the patients complain is of a vague nature. Wagner advises exploratory puncture of the mediastinal cavity and repeated x-ray examination of the entire thorax. When the diagnosis has finally been established, treatment is surgical.

H. Fischer (Arch f klin Chir 150 656 (June 21) 1928) describes 3 cases in which dysfunction of the thymus gland due to *adherent mediastinopericarditis* may be the cause for both physical and mental maldevelopment. This may be the result of direct distortion of the thymic function but more probably it is caused indirectly by the interrelationship of the thymus with the other endocrine glands.

P. Armand-Delille and Bertrand (Bull et mém Soc méd d hôp de Paris 52 1705 (Dec 13) 1928) describe a case of a child 10½ years old, who entered the hospital with fever, tachycardia and the clinical signs and symptoms of tuberculosis. Advanced adenopathy was revealed by the x-ray. The diagnosis of *mediastinal tuberculosis* with involvement of the pericardium was made and treatment of rest in bed and actinotherapy, artificial and natural, brought about a complete cure with a gain in weight, disappearance of the pathological signs, and a return to normal of the pulmonic and cardiac functions.

**TREATMENT**—Guadiani, cited by Wagner (*loc cit*) has classified the treatment of these cases of mediastinal suppuration as follows: "The abscess which gravitates not lower than the fifth dorsal vertebra can be successfully drained by a cervical mediastinotomy, while all others

should be approached by rib resection through the dorsal route."

**TUMORS.**—T. Shennan (J Path. and Bact 31 365 (Apr) 1928) reports a series of 31 cases of tumors found in the mediastinum and lung, 25 of which were carcinomas, 4 thymomas, and 2 sarcomas.

In a study of mediastinal tumors G. J. Heuer (Arch Surg 18 271 (Jan) 1929) states that the *benign* type includes dermoid and other cysts and connective tissue tumors. One hundred and thirty-five dermoid cysts have been reported. Many of these were found at autopsy. Total **extirpation** has the lowest operative mortality and has resulted in a cure in 90 per cent of the cases. Other types of cysts of the mediastinum are very rare. The benign connective tissue tumors of the mediastinum include fibroleiomyomata, xanthomata, chondromata or chondromyxomata, fibromata, lipomata, ganglioneuromata, and hour-glass tumors. Most of these are rare, but hour-glass tumors arising from the spinal nerves are not infrequent. The latter produce symptoms of cord and mediastinum compression. Operation for hour-glass tumors has yielded only fair results.

The *malignant tumors* of the mediastinum include lymphomata, lymphocytemata, lymphosarcoma, and Hodgkin's disease. The simple lymphoma is rare. The lymphocytoma is characterized by a predominance of small cells resembling lymphocytes. Lymphosarcoma is the most common of the mediastinal tumors. It fills up the space between the vessels, surrounds the trachea and esophagus, involves the pleura and lungs, and metastasizes early. Hodgkin's disease

rarely begins in the mediastinum. As a rule, it is easily recognized.

**CYSTS.**—Moller (Acta radiol 9 460, 1928) reports a case of congenital cyst occurring in the mediastinum which was diagnosed from the x-ray examination and later successfully operated upon. He describes 5 cases of congenital bronchiectatic cystic formations, 1 of which probably developed from an accessory lung. The diagnosis of the cystic conditions may be difficult, due to the close resemblance to that of cavernous tuberculosis. The most notable x-ray feature is the peculiar arrangement of the cavities in relation to one another, each being sharply delimited but irregularly placed and separated from the other cavities by a minute network of consolidations without any intervening infiltrations or pulmonary tissue.

**Venous Pressure and Mediastinal Disease**—M. Villaret and M. Martiny (Presse méd 37 249 (Feb 23) 1929) studied the *peripheral venous pressure* in patients with mediastinal tumors, chronic mediastinitis, pericarditis, pleurisy, empyema and in pneumothorax. They found the pressure increased in all cases of mediastinal conditions and believe this increase to be due to the depression of the superior vena cava by the mediastinal pathology, although in some rare cases of retractive fibrous mediastinitis, dilatation rather than depression of the superior vena cava occurs. In these cases, the venous pressure was normal or subnormal. The size of the mediastinal masses appears to be of less importance in the regulation of the pressure because the plasticity of the tissues is sufficiently yielding that even a large tumor may not be

able to depress the vena cava. These authors believe the increase of venous blood-pressure to be a valuable guide in the prognosis and treatment of *pneumothorax* and especially as a control in the cases where thoracentesis and artificial pneumothorax are performed.

**MELANODERMA (CHLOASMA, LIVER SPOTS)** is characterized by a brownish or yellowish coloration of the skin occurring in patches of various shapes and sizes.

Loeper, Ravier and Lesure (Progrès méd 44 277 (Feb 16) 1929) observed a melanoderma in a patient with advanced pulmonary tuberculosis. The face, axillæ, lumbar region, genitalia as well as the oral mucosa showed hyperpigmentation. Spleen and liver were definitely enlarged.

No symptoms of suprarenal insufficiency were noted. Autopsy showed the spleen to be filled with ferruginous and melanotic pigment and the debris of erythrocytes. The authors conclude that the pigmentation of the skin and mucous membrane was caused by a special "melanodermic" form of tuberculosis of the spleen.

**MENINGITIS.—MENINGOCOCCIC.**—With the marked increase in prevalence of cerebrospinal meningitis throughout the country recently, a number of reports have appeared indicating a greater virulence than usual with an accompanying higher mortality rate nearing 50 per cent.

Multiplicity of strains of meningococci is noted by several, 22 different strains being isolated from the cerebrospinal fluid of 200 patients reported by A. S. Pope and J. L. White

(J Prev Med 3 63 (Jan) 1929) As recommended by R D Herrold (J Infect Dis 42 79 (Jan) 1928), they isolated meningococci in 92 per cent of the cases by the addition of 0.5 to 1 c.c. of freshly drawn cerebrospinal fluid to a tube of phosphate blood agar

Fulminating cases of meningitic septicemia, with and without meningitis, were reported by R Middleton and W Duane, Jr (Am J M Sc 177 648 (May) 1929), Dusolier (Arch med d' Angers 32 41 (Mar) 1928), A Sophian (J Missouri M A 26 207 (May) 1929), Cannon and Long (Trans Chicago Path Soc 13 18 (June) 1928) and Irish (Trans Phila Neur Soc (Nov) 1929) with a high percentage of deaths occurring within 24 hours of the first signs of illness Bache and Klemperer (Internat Clinics 1 175 (Mar) 1929) report fulminating bacteriemias with conspicuous purpuric rash, with and without meningitis

**DIAGNOSIS** — Esselbrugge (Monatsch f Kinderh 43 45 (Mar) 1929) avers the *uranin test*, which he performed on 53 children, to be of value in early diagnosis and differentiation of meningitis from other diseases with meningeal symptoms

J C Schippers and H J Peters (Nederl Tijdschr v Geneesk 2 4514 (Sept 15) 1928) found that in the presence of meningitis, fluorescein sodium given orally (20 mg per kilo of body weight) passes into the spinal fluid in concentration greater than  $0.04 \times 10^5$  and believe the test to be of value in differentiation of acute meningitis from other diseases of the central nervous system

H Williams, R Van Woert and V Bergstrom (J A M A 93 437

(Aug 10) 1929) isolated live meningococci from the spinal fluid obtained 26 hours after death of a girl 8, dying the fourth day of illness

**TREATMENT** — With the unusual fulminance and extreme virulence noted in many cases, the serum was sometimes thought to be of little avail, but frequently progress of the infection was too rapid for any treatment to be effectual and multiplicity of meningococcic strains lessened the benefit to be derived from sera

M P Borovsky (Am J Med Sc 179 82 (Jan) 1930) approves, and Pope and White used the agglutination test as a basis for selection of proper serum, I S Wright, A C de Sanctis and A E Sheplar (Am J Dis Child 38 370 (Oct) 1929), however, felt that the agglutination test was unreliable, as it did not give uniform results They claim that the therapeutic test is the only method of determining the curative value of a specific serum and that potency rather than frequency of administration is the essential determining factor

R N Klemmer (Atl M J 31 242 (Jan) 1928) successfully treated a patient by **lumbar, cisternal and ventricular routes**. V Paleso (Wien klin Wchnschr 41 1182 (Aug 16) 1928) and A Bennett (J A M A 93 1060 (Oct 5) 1929) approves of **cisternal puncture** as it gives better drainage and distribution of serum

P F Stookey, B L Elliott and F Teachenor (J Iowa M Soc 19 447 (Nov) 1929), in reporting 183 cases, found serum used early was effective and used **cisternal puncture** and treatment frequently, particularly in spinal block, with better therapeutic results They also suggest change of sera if

results are not good in a specific case. With increased cerebrospinal pressure they call attention to the value of intravenous administration of 50 per cent glucose for dehydration. Twenty-four of their patients died within 24 hours and they mention that only 18 cases were reported in American literature where meningococci did not invade the central nervous system, a condition which has been disclosed frequently in the increased prevalence of the disease.

J. B. Neal, H. W. Jackson, E. Appelbaum, and E. J. Banzhaf (J. A. M. A. 91:1427 (Nov. 10) 1928) prepared an antibody which gave a mortality rate of 12.5 per cent in 24 cases so treated—in some where anti-meningitic serum had been used without apparent results. Less quantity was needed than the usual amounts of serum used, 20 c.c. each 24 hours, proving to be sufficient.

The constant plea in cerebrospinal meningitis is for early diagnosis and early use of serum. Diagnostic spinal puncture, whenever meningitic symptoms are present or suspicion of meningococcic infection arises, will lead to earlier diagnoses. Cerebrospinal pressure is probably increased in the majority of cases, the degree depending upon the progress of the infection. The fluid is frequently cloudy and the cell count varies from several hundred to many thousands, decreasing to below a hundred with successful treatment. Polymorphonuclear leukocytes are 100 per cent in most cases and Gram-negative intracellular diplococci should be found. In the absence of positive findings in the fluid, blood cultures should not be omitted. The sugar content of the cerebrospinal fluid is

usually decreased with the extension of the process, while the chloride content may be slightly reduced, differentiating cerebrospinal meningitis from tuberculous meningitis where the chloride content is usually low, dropping at times to 40 to 60 mgm. per 1000 c.c. when it is diagnostic and the sugar content increased above the normal of 45 mgm. per liter. In epidemic encephalitis the chloride content is increased above the normal of 75 mgm. per 1000 c.c., as is also the sugar content. A return towards normal sugar content is indicative of recovery from the meningococcic infection.

The general trend in treatment is toward more frequent spinal drainage, dehydration with intravenous administration of 50 per cent glucose solution when indicated and more frequent use of cisternal puncture and treatment.

Maintenance of nutrition at as high a level as possible is helpful as in any infectious disease.

**MENSTRUATION.—MORPHOLOGICAL PROCESSES**—A considerable revision of the concept of the histology of the endometrium during menstruation is made necessary as the result of recent revelations on the hormonal and chemical influences as well as recent observations in the higher mammals and especially in the monkey, *macacus rhesus*. The morphological processes concerned in menstruation are found to be closely governed by these fundamental physiological activities.

**MENSTRUAL CYCLE**—The following is a brief summarization of the present view of the various phases of the menstrual cycle.

1 *Post-menstrual phase (rest)* — The post-menstrual characteristics of the uterine mucosa within the 4 or 5 days after the menses are well recognized. The uterus is small and pale, the mucosa is thin, containing straight simple glands, and the surface and gland epithelium is of a low columnar or cuboidal type. In the ovary one finds a retrogressing corpus luteum.

2 *Interval phase* — During the next 2 weeks there is a slow growth of the mucosa without secretion. The epithelium becomes thicker from day to day and the glands more tortuous. In the ovary the corpus luteum exhibits a more advanced retrogression. In addition one finds the earliest stage of the new corpus luteum, resulting from the rupture of the mature Graafian follicle.

3 *Premenstrual Phase (pregnoid)* — This stage reveals a secretory activity of the epithelium and more particularly of the tortuous glands. The surface epithelium is thick and edematous. The stroma cells undergo hypertrophy, especially in the superficial stratum, with marked decidual changes. In the ovary there is noted a typical mature yellow body.

4 *Menstrual Phase* — There is still a considerable difference of opinion as to the actual amount of endometrial tissue cast off during the bleeding phase.

**MECHANISM OF MENSTRUATION.** — According to the modern concept of menstruation, 3 types of uterine activity are possible in the human female, namely:

1. *Menstruation by Rhexis* — In this type, first described by Schroeder, in 1914, the functional layers (compacta and spongiosa) are exfoliated, leav-

ing a raw wound, the base of which is formed by the unchanged basilar layer. The mature corpus luteum which accompanies the pregravid endometrium, is followed by degenerative changes of the corpus luteum and death of the ovum. Menstruation then occurs by rhexis, with a regeneration of the endometrium from the basal layer, evident on the third day. Fragments of the endometrium may be found in the menstrual discharge.

2 *Menstruation by Diapedesis* — In this type, described by Gebhard in 1899, there is an entire absence of endometrial exfoliation. Bleeding occurs from rupture of small subepithelial hematomata, the blood escaping through small fissures in the surface epithelium. This mechanism is inferred from the presence of vascular engorgement as evidenced by large quantities of blood lying free in the tissue and small accumulations of blood immediately beneath the surface epithelium (so-called subepithelial hematomata of Gebhard). This process is of infrequent occurrence.

3 *Menstruation with Anovulation* — In this type, described by Corner and Hartman in 1927, menstruation occurs from an inactive or almost resting mucosa. Observations were made on the monkey, *macacus rhesus*, but no definite proof of the existence of this form of menstruation has been obtained in the human female.

**TIME OF OVULATION.** — The time in the menstrual cycle at which the follicle ruptures has only been recently determined by studies in the primates. Ovulation does not occur with menstruation, but rather in the interval.

The presence of newly formed cor-

pora lutea in the human ovary, 15 to 17 days after the beginning of the previous menstrual cycle, led Meyer, Schroeder and Novak and TeLinde to conclude that ovulation takes place between these times, *i e*, in the middle of the intermenstrual interval

G W Corner (J A M A 89 1838 (Nov 26) 1927), in a study of the monkey, found ova in the tube on the fourteenth day, and in the uterus on the seventeenth day after the beginning of the last menstruation C G Hartman (Am J Obst and Gynec 19 405, 1930) found a fresh, ruptured follicle on the eleventh day Allen and Pratt found human ova in the tube on the tenth and fourteenth day

E Allen, J P Pratt, Q U Newell and L Bland (J A M A 91 1018 (Oct 6) 1928) have devised a method for recovering unfertilized human ova from the Fallopian tubes, *in situ*, by irrigation of the tubes after the abdomen has been opened The tubes are irrigated with normal saline solution by a special technic of clamping the lower segment of the uterus with special uterine forceps, the tips of which are covered with rubber tubing to avoid injury to the uterus With a syringe and small caliber needle, 20 cc of the irrigating solution are injected into the uterine cavity through the wall of the fundus while an assistant compresses the opposite tube at the uterine end with the thumb and forefinger

The washings are collected in several small watch glasses and carefully searched for extruded ova The ova are fixed, embedded in paraffin and sectioned for cytologic study

The most recent corpus luteum is removed for histologic study and for quantitative analysis of hormone con-

tent by injections or implants into ovariectomized rats

The best specimens were obtained from cases of myoma uncomplicated by pelvic inflammatory disease or cystic ovarian formations

More than 90 operations were performed at various stages of the menstrual cycle The largest number of operations were performed between the twelfth and sixteenth day of the menstrual cycle (dated from the first day of the previous menses) Nine specimens were recovered from the Fallopian tubes, 5 of which were successfully sectioned and definitely identified as tubal ova

From observations made from a study of these 5 unfertilized tubal ova, ovulation, they claim, takes place on, or 1 or 2 days prior to, the fourteenth (morning of the fifteenth) day following the onset of the previous menses

**MORPHOLOGY OF THE CORPUS LUTEUM**—The corpus luteum has 2 cycles, an infertile or abortive cycle, of short duration, and a fertile or pregnancy cycle

**I INFERTILE CYCLE**—A primordial follicle matures at cyclical intervals and forms a Graafian follicle Formerly it was believed that with follicular rupture there occurred marked hemorrhages into the follicle, forming the so-called *corpus hemorrhagicum*, which became cicatrized and had no further function According to the present view, however, after ovulation the corpus luteum undergoes a definite development and life history

Four successive periods of this temporary structure are recognized, namely

1 *Proliferation*—The collapsed follicle assumes an active growth of the

granulosa-epithelial cells and of the theca interna cells

2 *Vascularization and Maturity*—Blood channels from the theca push into and invade the lutein layer, with bleeding into the corpus cavity. The cavity then contains a little straw-colored fluid, often with a considerable hemorrhagic admixture. Just before the onset of the next menstruation, the follicle reaches its greatest development and the redness is gradually replaced by a yellowish tinge due to a moderate lipid content of the lutein cells.

3 *Retrogression*—With the onset of menstruation, a characteristic hemorrhage occurs throughout the follicle. The menstrual hemorrhage brings about a definite retrogression of the follicle, forming the characteristic bright yellow color of the corpus luteum. The lutein cells show marked vacuolation, but are still secreting an active substance and storing it temporarily.

4 *Corpus Albicans*—This represents the final involution body, showing fibrous hyalinization of the intercellular substance.

II **FERTILE OR PREGNANCY CYCLE**—If fertilization of the ovum occurs, the resulting corpus luteum is larger and more persistent. Accordingly only 2 developmental periods are evident, namely a period of growth and a period of retrogression, since the period of diffuse hemorrhage with the following period of yellow coloring is absent in pregnancy. At the beginning of pregnancy, therefore, the corpus luteum, instead of being deep yellow, as seen in normal menstruation, is a much paler body, showing marked growth of the entire lutein cellular tissue. The follicular

cavity is essentially concerned in this enlargement, the cystic cavities remaining distinctly preserved to the middle of pregnancy. The second phase of scarring and transformation into a corpus albicans does not begin until the termination of pregnancy, although distinct signs of a gradual loss of function appear as early as the fifth month.

III **ATRESIA OF THE FOLLICLES**—Although thousands of ova are contained in the ovaries at birth, at most, only 360 to 420 fully mature and rupture. Thousands of ova which do not rupture, develop, however, to a moderate degree and then regress and degenerate. In pregnancy, this atretic process is even more rapid, with marked lutein changes in the theca interna cells. Frank believes that much of the female sex hormone generated throughout the cycle is produced by the many growing follicles which early become atretic.

**MENSTRUATION WITH ANOVULATION**—The question of the indispensability of ovulation in the process of menstruation has been considerably clarified through the studies made by Corner and Hartman of the sex cycle of monkeys. These animals menstruate to a large extent like human beings. In many instances when the ovaries were removed from menstruating monkeys with normal menstrual histories, they failed to reveal any evidence of preceding ovulation. No preceding follicle or corpus luteum was discovered, nor was there any other evidence of follicular activity.

C. G. Hartman (*loc cit*) observed that in the summer months, ovulation ceases in some of these animals, but

menstruation continues, nevertheless with periodic regularity. This apparently represents a non-breeding non-ovulating season.

Robert Meyer claims that this periodic bleeding is not a genuine menstruation, because it is not associated with the characteristic preparatory endometrial changes nor with extensive endometrial desquamation.

No definite proof has been obtained in the human female to show that menstruation occurs without ovulation. In several patients near the time of an apparently normal menstruation, Mazer noted an absence of premenstrual endometrium and of "female sex hormone."

E. Novak (J. A. M. A. 94:833 (Mar. 22) 1930) believes that certain pathologic forms of hemorrhage which retain a slight degree of periodicity are to be viewed as human analogues of menstruation without ovulation. The endometrium in these instances fails to show the markedly hypertrophic and secretory changes characteristic of the human premenstrual phase. Ovulation does not occur, since corpora lutea are absent, but there is, instead, a persistence of the unruptured Graafian follicle. Novak, therefore, terms this a "follicle type of menstruation." It is his opinion that the "follicle type" of menstruation without ovulation is a form of pseudomenstrual bleeding and occurs in many women for a short time at puberty and the menopause.

**THE CAUSE OF MENSTRUATION.**—According to Frank, no matter which type of menstruation exists, bleeding does not seem to occur until the endometrium has been activated by means of the female sex hormone,

followed by the abrupt withdrawal of this activating agent.

The problem of the origin of the stimulus essential for menstruation in the light of modern research in endocrinology opens up numerous avenues for speculation.

Robert Meyer's theory of the "*Primat der Eizelle*" or "primacy of the ovum" long held sway. According to this theory, the ovum exercises a protective influence over the corpus luteum. The death of the ovum initiates the retrogressive changes of this structure, after which menstruation occurs. This theory is, however, no longer tenable.

C. G. Hartman (*loc cit*) found that the removal of the Fallopian tubes with their ova in the opossum, did not interfere with the sexual cycle. In a monkey, he washed an egg from the uterus per vaginam on the sixteenth day of the cycle. The animal menstruated later on, just as though the egg itself had not been disturbed.

Similarly, Allen, Pratt, Newell and Bland (Am. J. Obst. and Gynec. 19:181, 1930), successfully removed human ova from the tube by washing, but the menstrual cycle remained undisturbed. These investigators noted definite signs of degeneration in the ova which were washed from the tube a few days after ovulation. This probably indicates that the ovum is short lived and is therefore, not the underlying factor in menstruation.

G. A. Wagner (Zentralbl. f. Gynak. 52:10 (Jan. 7) 1928) believes that the ovum, like the corpus luteum, is an inhibitor of ovulation and menstruation but is effective only when combined with other body cells, as before the rupture of the follicle or after its implantation.



The stimulus leading to those changes in the uterus in preparation for pregnancy, which, in the absence of fertilization, terminate in menstruation, arises probably in the ovary, although not in the ovum

A S Parkes and C W Bellerby (Proc. Roy Soc 101 71 (Feb 1) and 102 51 (Aug 2) 1927) suggest a stromal secretion of the ovary. They succeeded in maintaining the menstrual cycle in animals, even though the alternating growth of follicle and corpus luteum in the ovaries had been supposedly destroyed experimentally by irradiation. They believe, therefore, that the menstrual cycle is independent of the ovogenic parts of the ovary.

According to Frank, however, these supposedly "sterile" animals are only temporarily sterilized. This effect is followed by regenerative processes which in turn, produce "female sex hormone." Full regeneration of the follicle elements, he claims, will follow from the downgrowing epithelium from the surface of the ovary. Investigations were carried out in women whose ovaries were subjected to x-rays. Although an early disappearance of a threshold amount of female sex hormone was noted in the blood of those who received sufficient radiation, a reappearance of the hormone was observed later when the ovarian activity returned.

To be considered also, is the vicarious function of some other gland, probably the pituitary, in maintaining the menstrual cycle.

It is apparent from these observations that the cause of menstruation may have to be looked for outside the Graafian follicle and corpus luteum, perhaps outside the ovary itself.

Hartman (*loc cit*) claims, however, that the ovary is essential to the continuation of menstruation, even though it is merely an intermediary link in the endocrine chain. The interrelationship of these endocrine glands is especially evident in the search for the cause of menstruation.

### MERALGIA PARESTHETICA.

—This condition is characterized by paresthesias, pain and some objective sensory disturbance over the anterolateral surface of the thigh. According to J H Huddleson (Am J M Sc 175 823 (June) 1928), it develops as a result of various types of lesions, which may be irritative and partially destructive, "acting on the peripheral nerve, dorsal root or its ganglion—or within the dorsal horn on the cell bodies. The extent and exact location of the skin area affected varies markedly in different cases." These variations are explained by the peculiarities of nerve distribution. The treatment consists in finding the cause and removing it; and since there are many causes an exhaustive study in each case is indicated. Symptomatically, the usual remedies for neuralgic conditions are effective in some instances. In other cases surgery is required.

Byron Stookey (J A M A 90 1705 (May 26) 1928) gives a comprehensive review of meralgia paresthetica. He defines the affection as consisting of paresthesia or pain in the distribution of the external cutaneous nerve of the thigh. While a great many causes are assigned, there is agreement on the much greater prevalence in the male sex.

The pain usually appears on standing or walking and is relieved by lying

down Stookey describes a case in which the pain on walking or standing was so intense that the patient, a man, was unable to work. The external cutaneous nerve was exposed at its exit from the pelvis and was found to be sharply angulated beneath the origin of the sartorius muscle. The nerve passed in a sharp angle over a slight bony ridge on the ilium and at this point it appeared slightly thickened and congested. The nerve was cut and the ends left in alignment between smooth fascial planes and it was thought that spontaneous bridging might take place, in which case the nerve would be sufficiently lengthened to make recurrence of pain improbable.

Subsequently, the writer dissected this nerve in many cadavers and noted a marked frequency of angulation of the nerve as it emerges from the pelvis, medial to the anterior spine. This abrupt angulation is considerably increased by extension and lessened by flexion of the thigh. Several variations in the manner of its emergence from the pelvis were encountered. The nerve may pass superficial to the origin of the sartorius muscle, or through this muscle, piercing it obliquely, or it may pass altogether beneath the muscle, lying on a ridge of the ilium, in 1 instance it was found to cross the crest of the ilium immediately lateral to the anterior superior spine. In some instances, when the nerve passed beneath the sartorius, it lay within a shallow bony ridge or groove just beneath the anterior superior spine of the ilium. When these conditions obtained, the angle formed as the nerve left the pelvis was extremely sharp with definite tension on the nerve at this point, which was visibly increased with the

leg in extension. Stookey compares it to those cases where the inner cord of the brachial plexus passes over a cervical rib, or the ulnar nerve in cases of fracture of condyles of the humerus.

Stookey (*loc cit*) prefers the term "*neuritis of the external cutaneous nerve*" to meralgia paresthetica, and for treatment, he recommends **section of the nerve** at the exit from the pelvis without excision, the nerve ends being left in alignment so that spontaneous regeneration and subsequent nerve lengthening may take place.

**MERCUROCHROME.**—That the intravenous use of mercurochrome is associated with a not inconsiderable number of reactions such as vomiting and diarrhea, suggesting mercurial poisoning, has been mentioned by H. W. S. Wright (*Practitioner* 122:371 (June) 1929). During a period of 3 years in China, the author used the drug in doses of 10 c.c. ( $2\frac{1}{2}$  drams) of a 1 per cent solution and reports that he seldom saw any symptoms. In a series of 5 cases of acute gonorrhea, he gave 1 injection every 48 hours. A severe reaction followed in each case after the third or fourth injection. He believes the action of the drug is not due to its antiseptic properties but rather to the fact that it produces the ordinary reaction of a protein shock. If glucose be added, the action tends to be cumulative. The benefit derived is proportional to the severity of the reaction. While its action at times in **septicemia** appears little short of miraculous, again one is left unconvinced, as at times it produces no reaction whatsoever, and the patient recovers. Likewise, in renal infection it does good in some cases, although

other patients get equally as well without its use. In a series of 13 patients L. Martin and J. H. Hill (Am J M Sc 177 710 (May) 1929) administered mercurochrome orally to the point of salivation and noted that the bile was never bactericidal or inhibitory. In 8 cases of cholecystitis, there was no alleviation of symptoms. After intravenous administration, the drug may be demonstrated in the bile within 18 to 23 minutes, and within 18 to 24 hours the drug can be recovered by duodenal drainage. This bile is bactericidal and contains mercury. In another series of 8 cases of cholecystitis, 3 were not benefited, 5 were clinically cured and their bile specimens were sterile. Because of the storage of the dye in the gall-bladder, it is possible to obtain a shadow on x-ray films.

In a series of experiments, testing the comparative value between mercurochrome and iodine upon the skin in so far as bactericidal action was concerned, J. S. Simmons (J A M. A 91 704 (Sept 8) 1928) and F. E. Rodriguez (*ibid* 91 708 (Sept 8) 1928) found that iodine definitely was superior. On the contrary, G. F. Reddish and W. E. Drake (*ibid* 91 712 (Sept 8) 1928) found no difference, but since iodine is more irritating, very volatile and of high toxicity, they conclude that for pre-operative disinfection of the skin, mercurochrome is preferable.

In an experimental study of the antiseptic value of the drug, B. Douglas, R. C. Avery and C. Pilcher (J Lab and Clin Med 14 822 (June) 1929) produced infections in a series of 12 dogs, all locally, in the extremities. Eleven of the 12 cases did not

show any definite therapeutic advantage as compared with the lesion of a similar untreated infection.

That the toxicity of the drug bears a direct relationship to the purity of composition is the opinion of J. Eyre, H. E. F. Notton and W. J. Pope (Brit M J 2 238 (Aug 11) 1928) after a thorough study.

Mercurochrome was found not to be locally anesthetic by D. I. Macht (Surg, Gynec and Obst 47 123 (July) 1928).

That mixtures of mercurochrome and dextrose *in vitro* began to interact and cause precipitation of metallic mercury within 24 hours was found by D. I. Macht and W. C. Harden (J Pharmacol and Exper Therap 32 321 (Mar) 1928). They, therefore, advise the mixing of the 2 preparations only immediately before the injection.

#### MERCURY.—ADMINISTRATION

—J. L. Jona (Lancet 2 15 (Julv 7) 1928) introduced a new method of administration of heavy metals. He used the blood corpuscles as a vehicle for the metal. When a patient's blood is drawn off into sodium citrate solution, the corpuscles are centrifugalized off, washed, combined with the metal, washed 2 or 3 times until the supernatant fluid is free of metal, and then re-introduced intravenously in a saline suspension. Animal experiments showed that it was possible to administer intravenously in this way doses of lead, copper, mercury and other metals from 3 to 5 times as great as would kill the animal if they were introduced intravenously in ordinary solution under the same conditions.

#### PHYSIOLOGICAL ACTION—H. N.

Cole, J. A. Gammel, J. E. Rauschkolb, N. Schreiber and T. Sollmann (Arch Dermat and Syph 17 625 (May) 1928) found that after treating patients with intramuscular injections of mercuric sodium bromide (10 mg— $\frac{1}{10}$  gram—daily) over a period of 4 weeks, about 21 mg ( $\frac{3}{4}$  gram)

was excreted, of which 15 mg ( $\frac{1}{4}$  grain) was in the urine

K I Melville and R L Stehle (J Pharmacol and Exper Therap 34 209 (Oct) 1928) noted that mercuric chloride dissolved in serum has an extremely marked diuretic action when injected intravenously. The diuresis is due to an extrarenal action. Except for the latent period before diuresis begins, the action of mercuric chloride is identical with that of merbaphen.

**POISONING**—E L Harmon (Am J Path 4 321 (July) 1928) observed 4 cases of mercuric chloride poisoning from intravenous injection. The dosage in the injections was more than 5 mg ( $\frac{1}{12}$  grain) per kilo ( $2\frac{1}{2}$  pounds) of body weight. Two types of necrosis were found in the kidneys of each of the 4 patients. Calcification was observed only in the epithelium, the seat of coagulation necrosis, and the calcified cells were seen *in situ* as well as free in the lumen of the tubules. The liver injury consisted of a mild parenchymatous degeneration in contrast to the severe hepatic changes observed after mercury poisoning by mouth. Epithelial necrosis and mucosal ulceration of the colon were noted in the 4 cases.

A Ruther (Ztschr f Kreislaufforsch 21 313 (June 1) 1929) observed a case of fatal poisoning with mercuric chloride showing calcium deposits in the heart muscle. He believes that the calcium was deposited in the muscle fibers that had been injured by the mercuric chloride.

S Goldblatt (Am J M Sc 176 645 (Nov) 1928) reported that 38 patients were admitted to the Cincinnati General Hospital, over a period of 15 months, with a diagnosis of acute mercurial intoxication. Thirty-four made a frank avowal of suicidal intent. In all the cases, the drug was taken by mouth. His conclusions were (1) The history of bichloride ingestion was insufficient evidence for the assumption of a mercurial toxemia. (2) The prognosis as to fatality when the drug was taken orally rarely depended upon the emesis interval. (3) A persistent high leukocytic count, steady increase in the urea nitrogen, marked lowering of the chlorides and a continued decrease in the alkaline reserve, were unfavorable prognostic signs. (4) A secondary aplastic anemia was noted dur-

ing the acute toxemia. This was associated with a marked decrease in the clotting and bleeding time. (5) The relationship of dose to fatality or to organic involvement could not be demonstrated. (6) The intravenous use of Fisher's solution did not prevent death from acute mercurialism. (7) The therapeutic value of intravenous glucose and of alkalis by mouth could not be demonstrated.

**TREATMENT**—J M Haymen, Jr, and J T Priestley (Am J M Sc 176 510 (Oct) 1928) note a case of acute mercurialism with anuria and urea retention, showing marked increase in urinary output, with a prompt fall in the blood urea nitrogen and marked clinical improvement, after infusions of physiologic solution of sodium chloride were given.

E Cenini (Gazz d osp 50 373 (Mar 24) 1929) states that early injections of sodium hyposulphite and hypertonic solutions of dextrose give good results in the treatment of *acute poisoning* from mercuric chloride.

Decapsulation of 1 kidney has been reported as a means of treatment for mercurial poisoning, after other methods seem to fail. After decapsulation, venesections and infusions of dextrose solution are resumed.

T E McMurray and C G Gibson (M J and Rec 129 519 (May) 1929) report good results from the use of sodium thiosulphate in treatment of mercury poisoning.

**MESENTERY.—ANATOMY AND PHYSIOLOGY**—The blood supply of the intestine consists of the vasa recta arising from the last series of mesenteric arcades and passing directly to the bowel but alternating, one anterior, the next posterior to the bowel. Numerous lateral offshoots anastomose freely with branches from adjacent arteries. In the duodenum there is an occasional arcade, in the jejunum they are more numerous and in the terminal ileum a plexus is formed. W S Rothschild (Ann Surg 89 878 (June) 1929) studied the effect of ligating mesenteric ves-

sels in various locations in dogs. Aseptic precautions and amytal anesthesia were used. The results showed that interference with the superior mesenteric artery results in gangrene of the bowel, while interference with the circulation of the small intestine between the mesenteric attachment and the superior mesenteric artery is not usually accompanied by gangrene. Detachment of the mesentery from the bowel may not result in gangrene. Severance of the mesentery of the large bowel with preservation of the marginal artery does not interfere with the viability of the bowel. In dogs the reestablishment of circulation may take place through an omental graft, through the marginal artery of the segment, or through the formation of new vessels communicating with the severed vessels. Adhesions are not important in reestablishing the circulation except in the case of omentum. When omentum is wrapped around the intestine from which the blood supply has been ligated, gangrene will not occur if the area affected does not exceed  $3\frac{1}{2}$  cm. Because of the anatomical arrangement of the vessels the degree of safety in mesenteric ligation is much greater in man than in animals. When the viability of the gut is doubtful, conservative measures are justified as radical procedures may prove fatal.

Studies of the mesenteric circulation in the frog lead Landis (Am J M Sc 175 450 (Mar) 1928) to believe that the passage of fluid through the capillary walls depends upon the balance between the capillary pressure and the osmotic pressure of the plasma proteins, in agreement with the hypothesis of Starling. In de-

cerebrated rats and guinea-pigs the mean blood-pressure in the mesenteric arteries was about 100 cm of water. In the finest arterioles, the average pressure was 50.5 cm of water in the rat and 76 in the guinea-pig. The pressure fell in the capillary network of the rat from 30 cm at the arterial end to 17 at the venous end and in the guinea-pig from 38.5 to 18 cm. The colloid osmotic pressure in 3 animals ranged from 22 to  $27\frac{1}{2}$  cm of water. Thus, fluid is filtered from the blood in passing through the arterial end of the capillary network and is absorbed from the tissue spaces in the venous capillaries.

In an investigation of the mesenteric glands in dogs, C. Cassano (Polieclinico sez med 35 93 (Feb 1) 1928) found they contained not only neutral fats but also soaps and fatty acids. Two hours after the ingestion of a fatty meal the glands showed conspicuous activity in building up the large fat molecules at the expense of the soaps and other lipoids. After 12 hours' digestion, the neutral fats prevailed in greater quantity than the soaps and there were deposits of neutral fats inside the blood-vessels. Thus, there appeared to be a gradual passage of these fats into the blood circulation, contrary to the former opinion that they pass wholly by the lymphatics. From 24 to 48 hours after the last meal there remained a large quantity of fat in the glands, indicating storage characteristics. Even during fasting for from 7 to 15 days, the mesenteric glands still conserve part of the deposited fats with a certain amount of separation into fatty acids and soaps.

**MALFORMATIONS**—According to G E Waugh (Brit J Surg 15 438 (Jan) 1928), the syndromes arising from congenital malformations of the mesentery cannot be explained by any well known abdominal surgical disease, nor any purely functional disability which may be included in the term "indigestion." The most important physical sign is emptiness of the right iliac fossa, sometimes associated with asymmetrical enlargement of the abdomen on the left side. These signs are due to the failure of rotation and fixation of the embryonic mid-gut after reduction from the umbilical sac. By using the opaque enema shortly after ingestion of the opaque meal, x-rays often give definite diagnosis without necessity for exploration. These defects may frequently be remedied by operation.

**VOLVULUS**—Volvulus may appear in any of the movable viscera, but is most common in the sigmoid cecum and spleen. Ovarian cysts and pedunculated fibroids and occasionally a lax liver or stomach may become rotated. The chance of occurrence is directly proportional to the length of the mesentery. Most cases occur in young adults and in males. Over-eating, dietetic indiscretions, exercise and hyperperistalsis are important etiological factors. The symptoms are those of intestinal obstruction, acute, subacute, or chronic and there is often a history of previous attacks. The pathology varies from simple torsion to complete gangrene and is due to the interference with circulation and the bowel lumen. The 3 special conditions necessarily present before twisting of the sigmoid will occur are (1) A dolichocolon lengthening the intestinal segment,

(2) a Lane membrane fixing the 2 ends of the elongated loop, (3) a certain degree of retractile mesenteritis approximating the 2 ends of the segment. According to J P Pratt and L S Fallis (J A M A 89 1225 (Oct 8) 1927), early diagnosis depends upon the recognition of disturbed development as a cause of recurring attacks of abdominal discomfort. The present mortality of volvulus of the cecum is about 50 per cent. The simplest type of operation which will save the patient's life should be done, with a secondary corrective procedure at a more appropriate time. This is emphasized also by R P Rowlands (Brit M J 1 287 (Feb 16) 1929) who reports 4 cases. The first, a woman aged 45 years, gave a history of chronic indigestion and visceroptosis with hydronephrosis. In 1922 she had a gastroenterostomy for duodenal ulcer and an appendectomy. Five years later she experienced a sudden attack of severe abdominal pain with symptoms of bowel obstruction. At operation the next day the cecum was found greatly distended. It had made 2 complete rotations to the left, obstructing the ascending colon. The volvulus was untwisted, the cecal contents expressed into the transverse colon, and a cecostomy performed, suturing the cecum to the parietal peritoneum. The patient was in perfect health 3 years later.

The second case was that of a woman diagnosed chronic appendicitis. She had suffered, since childhood, from very severe constipation, with attacks of abdominal pain without fever. At operation the appendix was edematous and white, the cecum greatly dilated and in a low position.

On the ascending colon there was a white mark indicating the site of former twistings of the ileum on the colon. The anterior surface of the cecum was anastomosed to the descending part of the transverse colon, completely relieving all symptoms.

The third case was a woman, aged 61, who was operated upon for acute intestinal obstruction. When the greatly distended colon was accidentally opened by the surgeon, gas and feces escaped with a loud report. Malignant stricture of the sigmoid was diagnosed, a Paul tube inserted, and the abdomen closed. After operation the patient gradually recovered and the bowels moved naturally. Six years later she suddenly developed intestinal distention and severe pain in the lower abdomen. With a diagnosis of volvulus of the sigmoid the abdomen was reopened. The sigmoid was longer and larger than a coat sleeve, was rotated upon itself, and occupied the pelvis. The distended gut was drained by trocar, closed, and sutured to the line of incision in the abdominal wall. She was well when last seen, 3 years ago.

The fourth case was that of a boy 14 years of age, who suffered repeated attacks of pain in the left loin. Five years previously, acute appendicitis was treated medically. At operation the cecum, transverse colon, and sigmoid were greatly dilated. The appendix was removed. Two months later a pendulous, twisted sigmoid was resected and the ends anastomosed with good recovery.

A girl aged 17 years seen by V. Pauchet and P. Mornard (*Bul et mém Soc de chir de Paris* 20:53 (Jan 20) 1928) had suffered from

chronic intestinal infection with symptoms of intermittent obstruction since the age of 2 years. During an attack of complete obstruction, of 2 days' duration, she was operated upon for the relief of sigmoid volvulus. The sigmoid was enormously dilated and twisted at its base by a quarter turn. There was also a well developed Lane membrane between the base of the mesocolon and the abdominal wall and a retractile mesenteritis which approximated the beginning and end of the iliac colon. The membrane was divided, the colon mobilized, and the twisted, dilated dolichocolon was resected. **Temporary colostomy** was done and was closed at a later operation. The patient made a complete recovery. Simple untwisting of this type of volvulus is inadequate since it is difficult to fix so long a loop as to prevent recurrence. In addition, the chronic absorption from this loop continues. **Resection** is the logical treatment and should always be done in 2 stages.

Various unusual types of volvulus have been reported. W. A. Cochrane (*Brit M J* 1:193 (Feb 2) 1929) cites a case of volvulus of the ileo-cecal segment in a clockwise direction through more than half a circle. It occurred around the axis of the appendix, which was adherent to the left side of the pelvis. Good recovery followed correction of the volvulus, **appendectomy**, and **cecal plication**.

In the case recounted by M. Makkas (*Zentralbl f Chir* 56:786 (Mar 30) 1929), the volvulus was limited entirely to the cecum below the ileo-cecal valve. Hence there was no occlusion of the intestine. The patient was 3 months pregnant and presented

symptoms of an atypical appendicitis. The cecum was found slightly adherent to the pouch of Douglass and twisted to the left for  $180^\circ$ . When untwisted it was 10 cm long. A normal appendix was removed with complete recovery. Of 42 cases of cecal volvulus in women, 10 occurred during pregnancy.

A case of prenatal volvulus of the small and large intestine, caused by a mesenteric cyst, in a female colored child, is reported by A. M. Sala and I. Nachamie (*Arch. Path.* 8:180 (Aug.) 1929). The cyst was microscopically enterogenous. It had a mucosa, an inner circular and an outer longitudinal layer of muscle and a serosa. Of the muscles, the inner circular layer of the cyst split to encircle the adjacent intestine and the outer longitudinal layer was common to both.

P. Bertrand and C. Clavel (*Lyon chir.* 26:351 (May-June) 1929) describe a case of volvulus of the small intestine on its mesenteric axis, in a man aged 50 years. A right inguinal hernia, symptomless for several years, became irreducible, caused painful tension, and was associated with sudden intense abdominal pain and vomiting. The hernia was reduced the following day by the patient and pain subsided for a short while. Soon the temperature and pulse rate rose rapidly, the whole abdomen became painful and the feces contained blood. Operation revealed uniform distention of the small intestine with a complete volvulus down to, but not involving, the cecum. The intestine was untwisted and an ileostomy performed. The symptoms were not relieved, the patient grew steadily worse and died 2 days later.

**DIAGNOSIS** — Volvulus of the stomach can often be diagnosed by the x-rays. A case so diagnosed is reported by R. Choisy and L. Babaiantz (*Acta radiol.* 8:410, 1927). The symptoms were intermittent pain and vomiting, intestinal stasis, and pneumatosis, the retention of urine and amenorrhea. Laparotomy in this case revealed no pathology. Volvulus not exceeding  $180^\circ$  may cause no functional disturbance and may become reduced spontaneously. Such a case is described by H. Kohn (*Mitt. d. Grenzgeb. d. Med. u. Chir.* 41:220, 1929). Because of extreme cachexia, a man aged 77 years, who complained of chronic arthritis, was unsuccessfully searched for malignancy. The x-rays revealed volvulus of the stomach. Seven months later he died of carcinoma of the bronchi and pleura. Autopsy revealed complete atrophy of the left lobe of the liver, causing a transposition of the transverse colon between the stomach and diaphragm. This appeared to be the cause for the volvulus.

On the contrary, E. Breitskopf (*Beitr. z. klin. Chir.* 140:297, 1927) reports a case showing marked symptoms with only  $70^\circ$  of volvulus. The patient was a man aged 40 years, who suffered recurring attacks of gastric disturbance for 11 years. After a heavy mid-day meal he developed a very severe attack of pain without vomiting and took several doses of sodium bicarbonate. Following the last dose, pain was increased and the abdomen became progressively distended. In 4 hours there was cyanosis of the extremities and face, drum-like tenseness, and great distention of the abdomen. He was thought to have a perforated gastric



ulcer At operation the stomach was greatly distended, the body and fundus rotated about  $70^{\circ}$  around the long axis of the organ, forming a fold in the wall of the fundus on a line parallel with the lesser curvature. This extended from the cardia and presented a valvular effect. Attachments of the duodenum were markedly relaxed and in the descending portion of the duodenum there was a whitish vascularized opacity suggesting an underlying ulcer. The stomach was emptied through a gastrotomy which was then closed and the volvulus untwisted. After a stormy convalescence recovery resulted. X-ray examination suggested a stenotic condition of the pylorus, not sufficiently pronounced to explain complete closure, but apparently causing gastric stasis. This, with relaxation of the gastro-duodenal attachments, would seem to be the etiologic factors.

**PATHOLOGY**—Peculiar pathology occurred in a case of gastric volvulus reported by A. Lawen (*Deutsche Ztschr f Chir* 206 319, 1927). The pylorus and the antrum were stretched out like a tube. This, with the duodenum, was drawn along the greater curvature of the stomach toward the fundus, then across the anterior surface of the stomach to the right side of the cardia where it was slightly adherent. The stomach was twisted  $180^{\circ}$  on its longitudinal axis and the transverse colon was markedly drawn upward. The stomach was large, containing over 3 liters (quarts) of fluid. Marked gastropnoxis and relaxation of the diaphragm appeared to have etiologic significance. Two ulcers were present on the posterior wall which now presented anteriorly, due to the abnormal curvature. One

of these had perforated into the transverse colon. Both ulcers were excised, the perforation of the colon closed, and the stomach elevated by means of ruffling sutures in the lesser omentum. The abdomen was closed without drainage, and uneventful recovery followed.

**LYMPHADENITIS**—A. R. Short (*Lancet* 2 909 (Nov. 3) 1928) states that lymphadenitis is common in the mesenteric glands. There are about 200 such glands arranged in 3 sets between the layers of the mesentery. One set is close to the bowel, another along the loops of the arterial arcade, and the most numerous set distributed along the main trunk of the superior mesenteric artery. The glands draining the ileocecal angle are (1) the ileal glands in the mesentery of the ileum, (2) the anterior ileo-colic glands, (3) the posterior ileo-colic glands in the angle between the ileum and cecum, and (4) the appendicular gland (not constant) in the mesoappendix. Those draining the large intestine are (1) the epicolic glands lying on the bowel wall, (2) the paracolic glands along the arterial arcades, (3) the intermediate glands along the course of the main colic vessels, and (4) the main group at the origin of the major colic arteries. Some of the nodes draining the colon lie very close to the ureters. In simple lymphadenitis the nodes are enlarged, soft, white or pinkish on section and usually not adherent. It is difficult to say what degree of enlargement constitutes the pathological state.

Mesenteric lymphadenitis is very common in children. Pain may result from enlargement, but more especially from adherence to the peritoneal covering. It may be violent,

simulating renal colic or appendicitis, or occur as mid-abdominal pain, not related to food, and with, or without, a rise of temperature. Fever without obvious cause may alone be present. In a few cases, tuberculous glands may form easily palpable swellings in the abdomen which are rounded, slightly tender, and fairly firm. On rare occasions they may rupture. Spontaneous cure results in a majority of cases. Operation is indicated when pain is very violent or recurs frequently, when appendicitis cannot be excluded, when a large lump of uncertain nature is found in the abdomen or when abdominal catastrophe develops.

**CYST.**—Up to 1924, only 250 cases of mesenteric cyst were reported. The most probable theory of origin is that they are congenital, resulting from intestinal diverticula or inclusion of tissue from the genito-urinary tract. They develop between very vascular folds of peritoneum, are abundantly supplied with blood-vessels, and their posterior pole lies close to the inferior vena cava and the ureter. The plane of cleavage is often obliterated by pressure or inflammation. The mesenteric vessels sometimes are greatly dilated. Due to these factors, removal is generally difficult and often impossible. Diagnosis is seldom made until the tumor grows quite large, inflammation occurs, or intestinal occlusion develops. A case in a woman of 49 years, is recounted by L. Desgouttes and A. Ricard (*J de chir* 32 269 (Sept) 1928). The cyst had developed between folds representing the primitive mesocolon and the posterior parietal peritoneum. The chylous fluid in the cyst contained no cells and produced sterile cultures.

The only symptoms were a feeling of heaviness in the lumbar region and an abdominal tumor of several months duration. Operation revealed a cyst at the root of the mesentery. Due to adhesions, removal was very difficult and ligation of branches of the mesenteric artery was necessary. Uneventful recovery resulted. The mortality of 25 to 40 per cent from extirpation has led some surgeons to advise marsupialization, but this should not be done unless extirpation is impossible.

A somewhat similar case of spontaneous chylous mesenteric cyst is reported by G. I. Wilson (*Brit M J* 1 102 (Jan 19) 1929). Diagnosed as tuberculous peritonitis, operation disclosed a soft, white, cystic swelling of the mesentery, across which was stretched a band of small intestine of rather a bluish color. The swelling extended upward, pushing the transverse colon, great omentum, and stomach well up under the diaphragm and extended laterally behind both the ascending and descending colon. It was trilocular, but all parts communicated freely. Four and a half pints of milky fluid were drained, leaving a small quantity. Convalescence was uneventful, but 9 weeks later a flaccid cyst was palpable, suggesting slow re-accumulation of the fluid.

A case is recounted by T. Pederson (*Hospitaltid* 71 857 (Aug 9) 1928) of a girl aged 7 years, with a history of occasional abdominal pain. Following a fall, symptoms were exaggerated. At operation the omentum was found to be attached to a tumor, the size of a fist, developed from the small intestine and completely embedded in it. The tumor had ruptured. Recovery followed its removal with

20 cm of the small intestine. The growth was an unilocular cyst with walls of lamellar, fibrohyaline connective tissue almost without cells.

For 2 weeks after removal of a cystic ovary, I I Genkin's patient (Arch f klin Chir 151 646 (Sept 19) 1928) had fever as high as 104° F (40° C). She was discharged 1 month after operation, apparently in good health. A year and a half later she developed pain in the right side of the abdomen and noticed a movable swelling. Both increased, but there were no other symptoms. At operation a chylous cyst of the mesentery was removed. It was found to contain a gauze tampon rolled into a ball and adherent to the cyst wall in places. The patient made an uneventful recovery and is symptom-free.

**TUMORS**—Of 216 solid tumors of the mesentery previously reported, 113 were benign, 103 malignant. Of the benign, 49 were fibromata of the pure or mixed type, 44 lipomata of the pure or mixed type, 3 myxomata, 1 pure myoma, 3 neuromata, 10 lymphangiomas, and 4 hemangiomas. Fibroma is usually single, highly vascular, most frequently occurs in the distal portions of the ileum, and may attain great size. In 40 per cent of the cases reviewed, the tumors were closely adherent to the intestine from which they may arise, according to Brunetti. Clinically fibromata may be latent for months or years, suddenly causing symptoms of compression. The majority, however, are associated with digestive symptoms including a sensation of weight in the abdomen, pain at some particular point, diarrhea, crises of pain with vomiting, discomfort in the epigastrium, asthenia with emaciation, and

slight urinary disturbances. The increased size of the abdomen may be mistaken for that of pregnancy. The tumor is dull on percussion and is usually found in the right iliac fossa, occasionally in the left, rarely in the right hypochondrium or umbilical region. L. Courty and C. Falava (J de chir 33 473 (Apr 1929) report a case of *fibroma* with histologic continuity between the tumor and the fibromuscular coat of the small intestine. This appearance has been mistaken for inoperable carcinoma on occasion. In this case, the tumor was latent, discovered in a routine examination, and necessitated the resection of 30 cm of ileum.

**Early extirpation** is indicated to avoid greater technical difficulty. Enucleation often interferes with the intestinal blood supply, necessitating resection. Of 14 cases in which 75 cm were resected, all were cured. Whereas, of 5 in which from 1 to 2 mm were resected, only 3 recovered. The operation is often laborious and hemostasis difficult. Usually a large raw surface remains which easily becomes infected. **Mikulicz tamponade** is particularly indicated and apparently saved the life of the reported patient. Because of possible peritonitis and retro-peritoneal cellulitis, the operative prognosis is always grave. Of 12 cases of enucleation without resection, there were 10 successful results and 2 deaths, and of 22 cases of enucleation with resection, 18 recovered and 4 died.

Another case of latent *fibroma* of the mesentery is related by J. M. Grigorowsky (Deutsche Ztschr f Chir 210 390, 1928). Examination revealed a mobile abdominal tumor the size of 2 fists, which at operation

was found adherent to the cecum and ascending colon

A case is described by A. Fornero (Arch di ostet e gynec 14 593 (Dec ) 1927) of a woman aged 60 years. She complained of pain and a sensation of weight in the hypogastrium, tenesmus of the bladder, and a slight evening fever, the latter of 6 months' duration. Examination revealed a cervical polyp and a somewhat enlarged and irregular uterine mass diagnosed fibromyoma uteri. At operation the small intestine was so adherent that separation was impossible and was abandoned. The patient died 24 hours later with symptoms of myocardial insufficiency. At autopsy a pasty, elastic tumor was found, originating in the lower part of the mesentery. It rested on the uterus and adnexa but was not adherent to them. It was about 9 cm. in diameter, contained hemorrhagic areas, and a cavity in which were found putrid masses with a fecal odor. The cavity communicated with one of the adherent loops of intestine. The wall of the intestine was not infiltrated, but the mesentery was thickened and retracted. Microscopic diagnosis was round cell sarcoma.

#### METABOLISM.—PROBLEMS OF METABOLISM

—P. S. Potter (Arch Pediat 45 410 (July) 1928) remarks that food requirements for infants and children have to supply sufficient energy for the basal metabolism, growth, muscular activity and waste. Premature infants require very little food. Small infants which are premature, according to Potter, may need but 50 calories and large premature infants may require as high as 150 calories per kilogram

(2 $\frac{1}{2}$  pounds) of body weight. Since premature children of necessity manufacture less heat than the full-term infants, they should have more protection than at any other period of infancy. The average normal infant requires approximately 100 calories for the first 6 months. Potter remarks that the basal metabolism of sick or fasting infants is higher per kilogram of body weight than that of normal infants. Therefore, unless additional calories are added, no gain in weight will ensue. Potter finds a definite association between metabolism and pulse rate. With an increased metabolism there is, of course, a more rapid pulse, which he believes is not due to the mere mechanical work of the circulation but rather indicates muscular activity and general body function.

According to the age, size and habits of each child, the caloric needs with reference to muscular activity vary from 10 per cent to 100 per cent above the basal requirements. This must be accounted for in planning sufficient diet. Potter adds 15 per cent of the calculated calories for a quiet child, 25 per cent for a normally active infant, and 40 per cent for an unusually active child. Further than this, Potter suggests an additional 15 per cent for energy lost in waste matter and 20 per cent for growth.

C. C. Wang, M. Frank and M. Kaucher (Am J Dis Child 36 979 (Nov) 1928) in their observations on metabolism of undernourished children and comparing 10 normal with 26 malnourished cases, could determine no differences in the power to utilize food material or in the caloric assimilation of the 2 groups. The

percentage of absorption was the same regardless of the degree of undernourishment or of the actual caloric intake. Utilization, according to these observers, varies directly with intake, the ratio between the 2 being constant with a numerical value of 1.09. Fecal loss of heat is proportional to the intake, the percentage utilization remaining the same in all cases, independent of the weight of the feces or the fecal heat loss.

**CALCIUM AND PHOSPHORUS METABOLISM**—The same observers (Amer J Dis Child 55:856 (May) 1928) found wide individual variations regarding calcium metabolism between 2 groups of children, 10 control cases and 50 undernourished children. A slight tendency to increase calcium storage was noted in the undernourished infants.

Numerous researches have been made on the influence of cod-liver oil and irradiated milk on calcium and phosphorus metabolism. A. L. Daniels, G. Stearns and M. K. Hutton (Am J Dis Child 37:296 (Feb) 1929) find that in infants who are given modifications of cow's milk, there may be a failure of absorption of a sufficient amount of calcium and phosphorus to meet the physiologic requirements of the body. In their experiments, the absorption of these elements was influenced by the antirachitic power of the food mixture. Cod-liver oil was less effective as a means of supplying radiant energy in the form of vitamin D than was irradiated milk or irradiated olive oil. There is a greater difference between the calcium retentions than between the phosphorus retentions in infants on simple feedings of pas-

teurized and boiled milk as compared with breast-fed infants. Of those infants who received additional cod-liver oil, there was less variation in the phosphorus retention than in the calcium. This is especially evident in those cases receiving pasteurized milk. From these observations, Daniels and his co-workers suggest that *rickets* is related to an imbalance in the amount of calcium and phosphorus retained. With those cases who were given modifications of cow's milk, this appears to be due more frequently to a deficiency of calcium. A calcium-phosphorus retention ratio of approximately 2 (that is, calcium-phosphorus equals 2) is apparently normal for infants under 1 year of age. For optimum growth, infants between 2 and 9 months of age should retain between 40 and 50 mg. of calcium and between 20 and 25 mg. of phosphorus per kilogram of body weight. A high percentage of phosphorus in the stools of infants receiving cow's milk has been found to be correlated with a low absorption of calcium. By determining the percentage of phosphorus in the urine and feces, it is believed that early metabolic disturbances incident to the development of rickets in the infant receiving modifications of cow's milk may be ascertained.

**NITROGEN METABOLISM.**—C. C. Wang, J. E. Hawks and B. B. Hays (Amer J Dis Child 35:968 (June) 1928) found on investigation of the nitrogen metabolism of 2 groups of 10 normal and 39 undernourished children that the percentage of absorption was practically the same for both groups but that the nitrogen retention in the body as well as the nitrogen retention per kilo-

gram of body weight increased with the degree of undernutrition. They conclude that the protein requirements of undernourished children should be calculated according to the *standard* rather than the actual weight of the child.

Wang, Hawks and Kaucher (Amer J. Dis Child 36 1161 (Dec ) 1928), in another report concerning the caloric and nitrogen balance of normal and underweight children on high and low protein diet, arrived at the following conclusions: (1) Caloric loss through the urine is directly proportional to the protein output and therefore with the protein intake. (2) The ratio of calories to nitrogen in the urine also varies with the protein ingestion. (3) Nitrogen retention is proportional to nitrogen intake. (4) Percentage utilization of the calories of a person on a low protein diet is greater than in one on a high protein diet owing to the greater coefficient of digestibility of the food mixture of the low protein intake. (5) Undernourished children apparently utilize the nitrogen of a low protein diet more efficiently than do normal children. (6) There is striking weight gain after an increase of the protein in the diet, even in normal children but it is more marked in the malnourished cases. (7) These observers recommend 4 Gm (1 dram) of protein per kilogram ( $2\frac{1}{2}$  pounds) of body weight for undernourished patients. (8) They would suggest 1 quart (liter) of milk for all children, normal or undernormal, because of the protein content as well as the calcium and vitamins which milk contains.

**WATER METABOLISM.**—With our increase in knowledge of energy

requirements of the body, the study of water metabolism has become one of the important problems of the day. H. Goldstein (Arch Ped 46 371 (June) 1929) has studied the water of metabolism in healthy children as well as those in whom some disease was present. Diet modifies water balance to a great extent. Water retention occurs with carbohydrate and protein ingestion. If carbohydrates are less than 35 per cent in the diet, acidosis may occur. A high fat diet predisposes to water loss, and indirectly to weight loss. With severe cases of vomiting and great loss of water and gastric juice (especially hydrochloric acid) alkalosis, as is well known, occurs. Goldstein remarks that changes in water balance affect the alkaline reserve. Since compensation is adequate, however, the change is but temporary and the alkaline reserve remains fairly constant.

According to G. E. Simpson and A. H. Wells (J Biol Chem 76 171 (Jan ) 1928), any condition which causes a marked difference in the level of water excreted by the body should have its mechanism elucidated since it is of significance in the water balance of the organism. These workers have observed that during over-breathing the urinary excretion of water and chlorides is increased. When high concentrations of carbon dioxide are breathed these excretory products are decreased. These changes together with the increased excretion of water and chloride which occurs on waking from sleep, suggest that, in general, when other factors are excluded, the alveolar carbon dioxide tension is inversely related to the

amount of water and chloride excreted in the urine. When high concentrations of carbon dioxide are breathed, the amount of water in the red blood corpuscles is increased. When water is given to rabbits in the proportion of about 66 per cent of the total blood volume, a dilution of the blood occurs amounting to but 2 per cent. This is accompanied by a fall of about 5 per cent in the plasma nitrogen and by a subsequent greater fall in the nitrogen of the corpuscles. These observations have yet to be explained in pragmatic terms. When the body is exposed to warmth (40° to 50° C—104° to 122° F) for 15 to 30 minutes, a dilution of the blood is exhibited. When the exposure is to cold, the blood tends to concentrate. These experiments bear out the popular belief that people who live in warm climates are thin blooded and those who live in cold countries are thick blooded.

Water elimination by the skin in conditions of disease was studied by J. Meyer (*Presse méd.* 36:66 (Jan 18) 1928). He concludes that in *reverse* the most active agent in dehydration is perspiration. Perspiration runs a parallel course with basal metabolism in nutritional disorders. Where water retention exists perspiration is as important a factor as diuresis. The 2 eliminating processes are usually parallel in *eczema*, with 1 of them predominating and with large daily variations. Perspiration remains high in *cardiac edemas* regardless of the diuretic activity. Perspiration is constant and meagre in certain cases of *edematous* and *albuminuric nephritis*. This fact raises the question of extra-renal phenomena in these diseases.

**METABOLISM OF NERVOUS CHILDREN.**—H. C. Cameron (*Brit. M. J.* 1:185 (Feb 2) 1929) believes that normally the peculiar liability of the nervous child to the derangements of metabolism, especially *acidosis*, is a direct result of undue sensitiveness to emotional excitement or physical fatigue, but also that the state of disordered metabolism so produced, of itself, adds to the restlessness and irritability. The nervous child is predisposed to *acidosis*. Examination of these children preceding a nervous attack reveals a low blood sugar with ketonemia and diminution of the alkali reserve. Rational treatment, therefore, according to Cameron should include a reduction of fat intake and larger intake of easily digested carbohydrates and the provision of a daily depot of alkali. He suggests a mixture of cream and cod-liver oil and restriction of eggs and butter in those cases where these rich foods have been pushed for purposes of weight gain. Chocolate especially should be withheld. Meat, fish, vegetables, fruit are given as usual and likewise the cereals, wholemeal bread, oat cake, sugar, jam, jelly and boiled sweets. Cameron advises dextrose in the form of a drink flavored with fruit juice. Dextrose has several advantages over cane sugar as a means of replenishing the carbohydrate reserves. It is only one-half as sweet as sugar and it is absorbed rapidly into the blood stream and has not the same tendency to cause fermentative diarrhea. In some cases, it may cause slight urticaria. Cameron advises a daily dose of some alkali, such as sodium bicarbonate. For constipation, a little carbonated alkaline water or saline laxative is added to the morn-

ing dose of dextrose. By dietetic government along these lines and with the free administration of dextrose with a small amount of alkali, the child should be less disposed to develop nervous symptoms. Almost always the more direct symptoms of *acidosis*, such as vomiting, diarrhea or pyrexia, may be controlled. If alleviation does not occur, Cameron maintains that a focal infection is probably present. Encouragement, rest, elimination, freedom from infection, and a high intake of sugar appear to be the especial requirements of neurotic children.

**LACTIC ACID METABOLISM IN ATHLETES**—I. Snapper and A. A. Grunbaum (*Deut. med. Wchnschr.* 54:1494 (Sept. 7) 1928) made observations on 55 football players and found that large quantities of lactic acid disappeared from the organism in the form of sweat on hot days from 11 to 22 Gm. per person. Loss through the urine was correspondingly less in hot weather than in cold weather. They found that the lactic acid content in sweat was 10 times greater than the concentration in the blood. "Second wind," according to these investigators, may be partially dependent on the excretion of lactic acid in the sweat.

W. E. Burge and D. J. Verda (*J. Pharmacol. and Exper. Therap.* 34:299 (Nov.) 1928) studied the effects of various alcohols and anesthetics on sugar metabolism. They found that methyl and ethyl alcohol increase the utilization of sugar to a marked degree while glycerol produced only a moderate increase. Chloroform and ether produced a significant decrease in sugar utilization and deep anesthesia. Ethylene

decreased the utilization of sugar and caused slight anesthesia, whereas nitrous oxide had practically no effect on sugar utilization and did not produce any anesthesia.

**EFFECTS OF SUN AND WIND ON METABOLISM.**—W. Jakowenko (*Ztschr. f. Hyg. u. Infektionskr.* 108:259 (Jan. 30) 1928) states that certain reflexes in the autonomic nervous system on which normal health depends, are controlled by climatic factors, chiefly sun and wind. In a series of 40 experiments each lasting 3 days, performed at the sea-side, he found the basal metabolism was increased by the wind and by diffused ultra-violet rays and that it was decreased by an excessive amount of rays from the sun. Increase in basal metabolism observed during sun-and-air baths is due, according to Jakowenko, to irritation of the sympathetic nerve endings by the ultra-violet rays diffused from a wide expanse of sky and by the cooling effect of the wind. This metabolic increase produced by the action on the sympathetic nervous system is the aim of all *climatotherapy*. To obtain an optimum result, the wind velocity and the heat from the sun's rays should be moderate, with low wind velocity and great heat from the sun's rays, the basal metabolism is lowered and there are symptoms of stimulation of the parasympathetic.

**ADMINISTRATION OF SALT AND RESTRICTIONS IN ACID-BASE METABOLISM**—L. Schoenthal (*Am. J. Dis. Child.* 37:244 (Feb.) 1929) studied the effects of the administration of sodium chloride and of water restriction on the total metabolism and acid-base equilibrium of the body. Administration of sodium chloride in



addition to a regular diet and in the absence of water restriction, produced (1) an increase in the chloride concentration of the plasma, (2) a mild reduction of plasma bicarbonate, (3) a tendency of the plasma to shift toward the acid side, (4) changes in both directions in the water content of the plasma as revealed by the protein concentration, (5) a constant increase in excretion of bicarbonate in the urine with a shift in reaction toward the alkali, (6) a relative increase in excretion of fixed base over fixed acid, (7) a decrease in Gyorgy's coefficient in the urine, (8) a slight or moderate febrile reaction in the infants in most cases studied. Feedings of concentrated food with restriction of water produced the same changes in metabolism as would the administration of sodium chloride. The blood concentration, however, was marked and the fever was high. Characteristic symptoms of alimentary intoxication appeared. The results suggest the possible danger of indiscriminate administration of salt solutions to infants suffering from anhydremia. This may increase the degree of acidosis and prevent the restoration of a normal acid-base equilibrium.

**METRAZOL.**—C. Johnston (Bull. Johns Hopkins Hosp. 44:32 (Jan.) 1929) gives the following report on the use of metrazol. Pentamethylenetatrazol, or metrazol, was introduced originally as a substitute for camphor. It apparently possesses several advantages over camphor owing to the fact that it is water-soluble, can be sterilized, keeps indefinitely and acts very rapidly after peroral, subcutaneous or intravenous administration. The results of experimental work indicate that metrazol acts mainly by stimulation of the vasomotor and respiratory center and accordingly should be of definite clinical

value in the treatment of cases of **circulatory collapse** or in **poisoning by morphine**. Definite evidences of any direct action on the heart have been studied by Johnston chiefly in cases of **chronic myocardial insufficiency**. No effect was seen in the majority of patients, but 3, one of whom had advanced tuberculosis, were apparently improved by the drug. Of these 3 the blood-pressure was raised in 2, slowing of the pulse rate occurred in 2, slight diuresis occurred in 1, and all were subjectively improved. In no case was there any effect on the electrocardiographic record, either when taken daily during the period of administration of the drug or when taken at frequent intervals following the administration of a single dose. No harmful effects were noted. Johnston concludes that although the chief field of usefulness for metrazol is probably in the treatment of acute circulatory collapse, it may occasionally be used to advantage in cases of myocardial insufficiency.

### MIGRAINE, OPHTHALMIC.

—In spite of much research it cannot be said that any great simplification has been brought about in recent years concerning this universal disturbance. The more carefully one inquires into the case histories the more frequently one finds it to have occurred. Frequently because of the incomplete development of the syndrome, or by reason of its mildness some few individuals will deny they have had migraine. Close questioning for the many abortive or irregular types, however, confirms the belief expressed most persistently by Jelliffe and White (Diseases of the Nervous System, 5th Ed., 204-220, 1929), that practically everyone after puberty has had one or more, frequently more—attacks of migraine in either fully developed classical form or in one of its numerous irregular evolved types. E. Morabito (Pediatrics 34:1139 (Oct. 15) 1926) and Debre have made

special surveys of the occurrence of migraine in children

If what is here stated for adults be true then the studies on heredity as an etiologic factor are interesting examples of proving the obvious—"since heredity runs in every family "

**ETIOLOGY.**—The most satisfactory hypothesis still remains the general idea of Dubois-Reymond that vascular spasm influencing the meninges, brain cortex, or hypothalamic and medullary vasomotor centers was the most general direct producing cause. The factors underlying the vasomotor disturbance of vascular spasm are multitudinous. They are best summarized in Pollak's new work on "Headache" (E. Pollak Monograph f. Deuticke, Vienna, 1929), and in the studies of the authors already here mentioned in a paper by A. Monbrun (Rev. d'oto-neuro-opht. 6: 701 (Nov.) 1928) and in a paper by C. D. Leake, A. S. Loevenhart and C. W. Muehlberger (J. A. M. A. 88: 1076 (Apr. 2) 1927) on cerebral vasomotor disturbances. These authors have studied a series of 16 anesthetized dogs, in which the meninges were exposed. Definite dilatation of the pial vessels was observed within five minutes after the intravenous injection of from 1 to 5 c.c. of 10 per cent glyceryl trinitrate in 95 per cent alcohol. Measurements of enlarged photographs revealed an increase of from 14 to 40 per cent (averaging 21 per cent) in the diameter of representative vessels. The probable error in the measurement of these vessels was plus or minus 11 per cent. Subsequent injections into the same dog were usually without such marked results. As a control, the injection of glyceryl

trinitrate into an animal was preceded by the injection of an equivalent amount of the solvent used (95 per cent alcohol). This did not have a significant effect on the diameter of the vessels photographed.

Beauvieux, F. Piechaud and C. Rudeau (Rev. d'oto-neuro-opht. 7: 619 (Oct.) 1929) report on observations of 6 cases with marked spasms of the retinal vessels. H. Cantilo (Rev. de laryng. 50: 428 (June 30) 1929) would localize the vascular spasms in the meninges and dura of the cuneus region. The soreness of the orbital branch of the trigeminus, so frequently found, is referred through the nervus recurrens Arnoldi, the meningeal connection with the trigeminus.

The literature of migraine is rich in autobiographical records. Jelliffe and White in their textbook mention a few. Of recent years F. Schultze (Deutsche Ztschr. f. Nervenheilk. 100: 1, 1927) has added an account of his own headaches. These began in his fourteenth year. They were nearly always marked by scotomata. Headaches varied in intensity during the attacks, becoming milder as he grew older. Paraphasic or aphasic disturbances were not infrequent, at times only one-sided scotomata, involving the side opposite that of greatest pain. None of the various known hypotheses discussed by the author offer satisfactory explanations. He does not enter into the psychoanalytic hypotheses. There is no inner relationship with epileptic seizures according to this study.

Baumler (Deutsche Ztschr. f. Nervenheilk. 83, 1929) has also contributed an interesting autobiographical account, more particularly devoting

himself to the scintillating scotomata, still a baffling problem. He refers the hemianopsias to involvement of the primary optic neurones near the chiasm, and the flickering to occipital cortex disturbances.

Etiology may be discussed under the heads of indirect and direct causation, or underlying and acute factors. As mentioned, heredity is assumed by a number of observers to play a rôle and some have even made the effort to apply Mendelian hypotheses. W. Allan (*J. Nerv. and Ment. Dis.* 68: 591 (Dec.) 1928) speaks of it both as a recessive trait and as a sex-linked dominant trait (Jens Smith). This problem is here attacked statistically. Allan finds an incidence of 60 per cent in the general population and from this figure the frequency of migraine in parents, sibs and children was calculated, considering migraine first as a dominant trait then as a recessive trait. (Jelliffe reports it to be prevalent in 98 per cent of the population.)

W. Allan (*Arch. Int. Med.* 42: 590, 1928) also reports migraine as more common than is usually taught. These frequencies have been compared with the incidence of migraine in parents, sibs and children as given by a number of migraine patients. He concludes this inconclusive study as follows: (1) When both parents have migraine (56 families) 83.3 per cent of the children had it, calculated incidence 84.9 per cent if dominant, 100 per cent if recessive, (2) when 1 parent has migraine (240 families) 61 per cent of children had it, calculated incidence 61.2 per cent if dominant, 43.7 per cent if recessive, (3) when neither parent has migraine 3.7 per cent of children had it, calculated incidence,

0 per cent if dominant, 19.1 per cent if recessive, (4) a history of migraine was found in 1 or both parents in 91.4 per cent of 382 migrainous patients, calculated incidence 100 per cent if dominant, 95 per cent if recessive, (5) both parents migrainous in 26 per cent of 243 migrainous patients, calculated incidence 51 per cent if dominant, 60 per cent if recessive, (6) 1 parent migrainous in 60 per cent of 243 patients, calculated incidence 49 per cent if dominant, 35 per cent if recessive, (7) neither parent migrainous in 8.6 per cent in 382 patients, calculated incidence 0 per cent if dominant, 5 per cent if recessive, (8) among 1538 siblings of migrainous patients 67.2 per cent had migraine, calculated incidence 77.8 per cent if dominant, 78.7 per cent if recessive, (9) among 633 siblings of non-migrainous persons 11.8 per cent had migraine, calculated incidence 33.4 per cent if dominant, 32 per cent if recessive.

J. C. Moloney (*Arch. Neurol. Psychiat.* 19: 684 (Apr.) 1928) offers the phrase "submerged intrinsic physiopathic mechanism" as the causative factor, and links it with the as yet totally unexplained phenomena of allergy. Heredity again is the "pooh-bah," but heredity is only partially selective in its regional expression. This study disregards the well recognized fact that certain migraines and certain epileptic convulsive phenomena are fundamentally related to a single vasomotor disturbance. There is no real proof here offered as to the allergy and the vasomotor disturbance. In a more popular exposition the same author does not dwell much on vasomotor and allergic phenomena, but remains fairly consistent to the

vasomotor disturbance etiological factor, especially in its varying cerebral topographical localizations

At the annual meeting of the British Medical Association held in 1926, the whole subject was reviewed by Bramwell, Spriggs and others (Brit M J (Oct 30) 1926) Dr Edwin Bramwell in opening the discussion, spoke of the classical attack of migraine as comprising "an aura which is characterized by visual, and it may be other phenomena, indicative both of local and general disturbance of cerebral function, headache which is typically frontal and predominantly unilateral, nausea and vomiting" But he had at once to qualify this by stating that the headache might occur alone, that, in children particularly, vomiting might be the only symptom, and that the visual disturbances, the paresthesiæ, and the palsies, any or all of which may attend the headache and vomiting, may occur without either, but in circumstances which point to their migrainous nature Dr E I Spriggs, who made an interesting practical contribution to the discussion, took as a working definition "a periodic headache usually with some kind of aura, going on to vomiting, beginning in childhood or youth, and often hereditary"

As to the etiology of true migraine, it seems to be agreed that there must be a predisposition, usually hereditary, which enables a rather long and diverse list of determining causes to act, but as to the actual mechanism of the attack there is no such unanimity Dr Bramwell sees in it a vascular derangement, a localized spasm of the cerebral arteries during which the aura and other prodromal symptoms occur, followed by a relaxation, when

the headache, due to engorgement of the meningeal vessels, is the chief symptom Dr Gordon Holmes would not accept this view, and sought an explanation in a local swelling of the brain due to a temporary disturbance of the osmotic relations of its substance to the fluid in which it is bathed, this swelling could be supposed to produce the aural palsies, and by pressing on the meningeal nerves to cause the headache Dr Timme advocated the hypothesis which is no longer tenable that the symptoms are caused by growth in size of the pituitary body raising the intracranial pressure locally and generally, but he said also that migraine was a term which covered a number of conditions

Among other avenues of approach one finds many openings J I Margolis (Am J M Sc 177 348 (Mar) 1929) would associate the syndrome with pentosuria Beecher would have it, with many another, as a protein sensitization S M Oxlengandler (Klin med 6 1204, 1928) names peptone as one possibility W Berg (Klin Wchnschr 7 844 (Apr 29) 1928) blames it on tar anaphylaxis H Rogers, A Crémieux and Robert (Progrés med 2 1569, 1929) add a paresthetic case to the now voluminous literature Here an old otitis media played some role in an 18-year-old youth G H Laing (M Clin North America 11 49 (July) 1927) holds the intestines responsible, as does J Forman (Ohio State M J 24 115 (Feb) 1928) Few observers can get away from constipation O Muck (Klin Wchnschr 6 693 (Apr 9) 1927) argues that fasting stops migraine Finally some surgeons are incriminating the gall-bladder and

draining it J S Diamond (Am J M Sc 174 695 (Nov ) 1927) discusses at length the relation of liver dysfunction to migraine Thirty-five cases of cephalic and abdominal migraine in whom liver-function tests were carried out are reported by him The tests comprised the van den Bergh reaction of bilirubin in the serum, and the urobilinogen in the urine The results seem to point to a definite liver disturbance In 91 per cent of the cases, there was a state of latent icterus with a bilirubin retention of 1 to 5 units The urobilinogen was also found to be increased from 1 to 35 up to 1 to 200 giving the highest figures in cases with high bilirubin retention Such cases may be classed as hepatic migraine There were 21 females and 14 males, with ages varying from 19 to 46 years, most all giving familial histories Hemicranial pain of the periodic type was present in all Twelve cases were purely of the cephalic type without digestive disturbances In 15 cases, the headache was associated with nausea and vomiting, manifesting the so-called "bilious attack" In 8 cases, the gastric and abdominal symptoms were very severe simulating, in some instances, gall-bladder colic or gastric crises Three cases of the latter were subjected to laparotomy with negative findings and subsequent persistence of symptoms The last group may be classed as abdominal migraine The cases bear a strong analogy to the ordinary types of migraine Heredity, periodicity of the attacks, and the onset of the attacks with hemicranial or ophthalmic pain, somnolence, etc, all bear a striking resemblance to the ordinary migraine Spastic constipation was present in most all All cases were

carefully examined to rule out other pathology, especially biliary and hepatic pathology Other types of headaches including those of endocrine origin, were also excluded Many patients would attribute their attacks to the ingestion of red meats, goose, duck, turkey, or salmon, especially so when partaken of during a period of constipation Some analogy is here made to Widal's hemoclastic crises, the migraine being regarded as an allergic manifestation due to the inability of a deficient liver to detoxicate the substances brought from the intestinal canal

Toxic substances such as histamine and tyramine are capable of producing marked vascular changes, and if the meningeal or splanchnic vessels are affected, the resultant exudate and edema of the nerve bundles can give rise to an anaphylactic manifestation somewhat analogous to Quincke's edema which is responsible for the headaches and abdominal attacks Diamond is quite catholic in his remedial ideas He would have the patients avoid intestinal putrefaction, by abstaining from animal proteins, by changing the intestinal flora by the use of the acid bacillus milks, by relief from spastic constipation, and by avoiding emotional strain

M Chiray and A Lomon (Bull et mem Soc med d hop de Paris 51 932 (June 23) 1927) are suspicious of the gall-bladder and have recommended biliary drainage, as do P Vallery-Radot and P Blamoutier (Paris med 2 465 (Dec 3) 1927) also

Acids and salt, alkalosis, etc, are studied by A Simon (Monatschr f Psychiat u Neurol 68 544 (Mar) 1928) and O Muck respectively The former states that eating too much

salt or too much acid causes migraine and O Muck (Munchen med Wchnschr 73-982 (June 11) 1926, Klin Wchnschr 6 693 (Apr 9) 1927) has contributed an interesting paper showing how hyperventilation can induce migraine in the migrainous. Our personal experience has been that everybody is potentially migrainous and every hyperventilation experiment carried out has caused headache in every case. There is also little new in the general study of C W McClure and M E Huntsinger (New England J Med 199 1312 (Dec 27) 1928) of 78 patients in whom the etiology, symptomatology, and treatment are discussed. The onset of migraine at periods other than adolescence is said to be more common than is generally recognized, and paroxysmal headache is frequently the only symptom. The occurrence of positive cutaneous food protein reactions points to the advisability of withholding reacting proteins from the dietary.

Disturbances in lipid metabolism, abnormal liver function, and positive protein sensitization reactions were definite pathological findings, suggesting that hepatic dysfunction plays an important part in the production of symptoms, and that the condition bears some relation to the etiology of chronic cholecystitis and peptic ulcer. The authors point out the value of **intraduodenal therapy**—namely, the introduction into the duodenum through a tube of 30 cc (1 ounce) of 33 per cent **magnesium sulphate solution** at weekly intervals, and the importance of keeping the patient well nourished, the degree of relief being often in direct proportion to the gain in weight and strength. The **correction of eye strain**, working conditions, and other underlying causative factors must re-

ceive attention, but the adoption of surgical measures to relieve symptoms without careful forethought is deprecated.

Naturally, the endocrines are not neglected as possible etiological factors. From Timme's early speculation about the pituitary, taken up more recently by Zeiner-Henrikson (Tidskr f d Norsk Laeger, p 250 (Mar 15) 1928), down through the numerous polyendocrine etiologies, various authors implicate now this, now that gland of internal secretion. Thus, N C Stevens (New England J Med 201 801 (Oct 24) 1929) after wisely cautioning against unwarranted rhinological and dental operations, blames the thyroid, and if the patient is a woman the ovaries may also be at fault. A 1 to 2 years' program is laid out, with **rest and luminal** for the "nervous" cases. Apropos of the analsadistic regressions of menstruation which psychoanalytic study is revealing, J Sédillot (Bull et mém Soc de med de Paris, No 1, pp 22-24 (Jan 13) 1928), reports an interesting menstrual migraine with vaginal ulceration after each attack. Fournier (Rev neurol 32 934, 1925) also holds the **thyroid** responsible. Two cases are reported. Lévi (Rev neurol 32 936, 1925) makes 2 kinds of thyroid migraines, 1 with menstrual attacks and 1 with anaphylactic attacks. G Lyon (Bull méd 43 1145 (Oct 31) 1929) speaks of a hypo-ovarian group, as well as an anaphylactic group and a gall-bladder retention group. Duodenal sounds with 30 cc (1 ounce) of a 33 per cent **magnesium sulphate solution** are to be used in this latter group. D Paulian (Rev neurol 32 947, 1925) adds **peptone** to this. He blames migraine on **cholesterine**. Deslandres (Thèse d.

Paris, 1928) contributes an interesting thesis on the menstrual migraines and falls back on **corpus luteum therapy** Sterling (Flatau Festschrift, 828, 1929) believes that the pituitary thyroid and gonads are all involved in migraine

**SYMPTOMATOLOGY**—Practically nothing new has been added to the symptomatology although certain authors have rediscovered much that older observers had described very minutely In calling attention anew to the richness of symptomatology, especially abortive types of migraine, they have been of service To call every symptom due to vasomotor instability, migraine, when such occur in the vessels of the arms or legs (intermittent claudication) or in the abdominal viscera, and may even be accompanied by the classical head symptoms, is unreasonable Yet a certain number of observers have been writing such articles on "abdominal migraine," "kidney migraine," etc If these widely distributed disturbances can be shown to start primarily from vegetative diencephalic center involvements (diencephaloses as it were) then there is some reason in the effort to correlate, but few of these writers think in terms of the diencephalon Certain of these studies are well worth reading, thus one by N L Blitzsten and W A Bram (J A M A 86 675 (Mar 6) 1926) gives a clear presentation of the situation They rightly call attention to the fact that migraine may be accompanied, or rather be a localized expression, of a more widespread vasomotor disturbance, sometimes with predominant visceral localization, and these may be mistaken for gall-bladder or other visceral affections

As noted the scotomata have always been difficult to explain satisfactorily At the British Association meeting W H McMullin and E Bramwell (Brit M J 2 765 (Oct 30) 1926) offered some suggestions along the vasomotor lines One patient studied for 30 years showed marked migraine and scotomata and aphasia for many of her younger years, then for several years she had urticarial attacks and no migraine and then after 40 the migraine and no urticaria Klien (Brit M J (Oct 30) 1926) at the same time described a rare hexagonal network and ocular scotoma, interpreted by him as a retinal projection, since this is the shape of the retinal pigmented epithelium That the retinal fundus is involved has been known for years, Higgins (Brit M J (Oct 30) 1926) notes the marked contraction of the vessels of the fundus during the onset of the scotomata and their engorgement as the scotomata and migraine pass At the Paris Neurological Reunion, Lapersonne (Rev neurol 32, 1925) discusses the scotomata chiefly as retinal

Vestibular migrainous equivalents or accompaniments, such as vertigo, ringing in the ears, staggering, with nausea and vomiting were discussed by Heveroch (Rev neurol 32, 1925) at the Paris Neurological Reunion Facial forms with periodic tic-like expressions were dealt with by Meige (Rev neurol 32, 1925) at the same reunion

J L Halliday (Glasgow M J 106 281 (Nov ) 1926) emphasizes from the clinical point of view the marked sensibility to pressure of the cutaneous nerves, especially the supra-orbital His study of 40 cases is of interest as illustrative of what he

calls "overflow" or what in psychoanalysis is called displacement. Hallday regards headache as the product of 2 variable factors—an alteration in the equilibrium of the primary synapses, and the overflowing of impulses from a neighboring neurone. He considers them analogous to cases of referred pain occurring in such conditions as appendicitis, and differing therefrom only in the ease with which they can be provoked. The frequency of headaches as a symptom is attributed to impulses from cerebral as well as organic causes readily gaining access to the pain tracts of the scalp, the low resistance of the synapses guarding the pain tracts of the ophthalmic division of the trigeminal nerve accounts for the majority of headaches being frontal.

As bearing upon the important problem discussed by von Bergmann, Jelliffe and others, that functional, *i.e.* reversible processes (emotional), tend with time to become fixed and irreversible, *i.e.* organic disease, usually after 40. K. Pakozdy (Klin Monatsbl f Augenh 82:685, 1929; Klin Wchnschr 8:216 (Jan 29) 1929) reports an interesting case of severe migraine with later developing retrobulbar neuritis. Like all cases, if sufficiently and minutely investigated, her family also had migraine. At 17 she began to have left-sided attacks rarely with recognizable scotomata. A definite organic lesion ultimately developed in the papillomacular bundle as a result of the frequent severe vascular spasmodic states.

A. Strobl (Monatschr f Kinderh 45:68, 1929) adds an interesting case to the migraine, tetany, epileptiform medley so frequently brought up on the related problem of vascular

spasms as provocative of epileptic convulsions. Here there was a left-sided lung tuberculosis, and a pneumothorax reflex irritative focus is held responsible for the general trend of events.

To the already large literature of aphasic and other paretic accompaniments, L. Morenas and J. Dechaume (J de méd de Lyon 10:259 (Apr 20) 1929) add an interesting case history of a man, aged 66, who had attacks of migraine every 2 or 3 months since the age of 29. They were accompanied by aphasia and Jacksonian epilepsy with subsequent transient monoplegia. The hemicrania was not always on the same side and the epileptic disturbances with monoplegia occurred either in the legs or in the arms. The attacks were preceded or accompanied by various visual disturbances (amblyopia or scotomas but never diplopia), they never lasted more than half a day and always ceased after bilious vomiting. The Wassermann reaction was negative, and only slight alkalosis, bradycardia (pulse from 56 to 58), high blood-pressure and slight vasomotor disturbances (cyanosis and coldness of the feet and hands) were found on physical examination. Two children of the patient had had convulsions (tetany in 1, epilepsy in another). Seven days before death, the patient developed a right-sided hemiplegia (without Babinski's sign), aphasia, delirium and semicoma. All the symptoms disappeared in 48 hours but reappeared again a few hours before death. At necropsy only slight cerebral congestion was observed with congestion of the small vessels, several leukocytic thrombi and enlargement of the perivascular spaces with



small, circumscribed hemorrhages in the perivascular sheaths. The authors consider this case as a transition form between migraine and epilepsy.

Hilpert (*Zeit f N P*, 97, 1927) also offers an interesting autopsy report in a marked migrainous patient with aphasic, hemiplegic and hemianopic accompaniments. Here again there is traced a relationship between chronic irreversible changes and so-called functional paroxysmal states. Other related ophthalmoplegic types are described by H. Cantilo (*Rev de laryng* 50 428 (June 30) 1929), G. Caocci (*Boll d'ocul* 8 221 (Mar) 1929), H. Roger (*Rev d'oto-neuro-opt* 6 709 (Nov) 1928), with aphasia-paresthesiæ of upper extremities, C. Behmack (*Ztschr f d ges Neurol u Psychiat* 114 264 1928) and F. W. Marlow (*Am J Ophth* 11 222 (Mar) 1928) with convergent paralysis.

Status hemicranicus is a name given by W. Allan (*Arch Int Med* 42 590 (Oct) 1928) to the general situation in this interesting communication.

Psychotic accompaniments are well discussed by G. Mingazzini (*Ztschr f d ges Neurol u Psychiat* 101 428 1926) and by Moersch (*Passes Year Book*, p 41, 1924).

General clinical resumé's are found in many of the studies here cited. Certain of them go very extensively into the whole story, see the British Society and Paris Society Reports.

G. R. Kamman (*Minnesota Med* 11 231 and 411 (Apr-June) 1928) deals with the larger subject of headaches illuminatingly.

**TREATMENT** — Many of the older lines of treatment are to be found in the more recent literature. **Diet** still is a bulwark of the careful

T. G. Schnabel (*Ann Int Med* 2. 341 (Oct) 1928) develops a ketogenic diet with low carbohydrates and high fats. Some patients were refractory. Dollken (*Munchen med Wchnschr* 75 291 (Feb 17) 1928) falls back upon the nitrous compounds in pursuance of the vasomotor hypotheses. F. E. Ball (*Am J M Sc* 173 781 (June) 1927) tries **peptones** and in his study of 1000 family histories he would show an essential relationship between migraine, asthma, hay-fever, urticaria, epilepsy and eczema. S. Oxengandler (*loc cit*) has tried peptones intramuscularly in 11 cases. He advises caution. The endocrine shot gun therapy has been commented upon. W. Leibbrand (*Deut med Wchnschr* 54 2064 (Dec 7) 1928) would employ **procaine**. A. Tzanck (*J de med de Paris* 48 335 (Apr 18) 1929), **ergotamine tartrate**, also O. Muck (*loc cit*) has tried it to inhibit the sympathetic. Bouche (*Rev neurol* 32 944 1925) advises a weekly injection of 1 cc of **horse serum** with 0.2 mg ( $\frac{1}{1000}$  grain) of **crotalin**. It must be kept up a year.

At the Paris conference Sicard and Haguénau (*Rev neurol* 32 944, 1925) suggested several methods of treatment which had given them good results. The administration of powders of **peptone** before meals, the intravenous injection of **sodium bicarbonate solution**, and the subcutaneous injection of **milk** in doses of 3 to 5 cc (48 to 80 minims) twice a week for 10 doses and repeating the series 2 or 3 times. In addition to this treatment directed toward the migraine diathesis the writers also suggest the injection of **adrenalin** in small doses (0.25 mg —  $\frac{1}{250}$  grain)

in the vicinity of the temporal artery or the injection of dilute alcohol in the same region

The duodenal sound and magnesium sulphate lavage are the latest addition to the already formidable list of therapeutic suggestions for migraine

**MITE FEVER.**—B M van Driel reports a case (Arch f Schiffs- u Tropen-Hyg 32 363 (July) 1928) which occurred in a Javanese workman on a Sumatran tobacco plantation. The onset was sudden with fever and headache. There was a typical ulcer at the site where 1 year previously the patient had been bitten by a mite. Enlargement of the spleen and an indistinct maculopapular exanthem of the trunk were noted. Bronchopneumonia developed in both lungs. A few days later a clinical picture of acute paralysis agitans developed. The patient was unable to sleep and was wholly helpless. After 10 days, improvement began and 4 weeks after the onset of the illness, his eyes were inspected in the dark. A specific neuroretinitis, as described by Haab, was noted with indistinctness in outline, redness of the papilla, dilatation of the various veins, choroiditis, descemetitis. Diminished vision occurred in both eyes. It is interesting to note that the patient had no complaints regarding his vision during the illness. Improvement was gradual and the eye symptoms declined. On discharge, the patient showed a slight tremor of both hands. Van Driel advises eye examination in all cases of infectious diseases. Such a procedure would often be a diagnostic help in the temperate zone as well as in the tropics

**MOLLUSCUM CONTAGIOSUM.**—C G Crowley (Brit J Dermat 41 192 (May) 1929) reports cases of molluscum contagiosum occurring within a fortnight in 3 individuals after they had taken a Turkish bath at the same establishment. Distribution in each case was on the chest and abdomen

**MONILIA.**—J G Hopkins and Rhoda W Benham (New York State J Med 29 793 (July) 1929) discuss the morphology of these organisms. Their characteristic ivory color, smooth surface and pasty consistency distinguish them from many related organisms met with in skin lesions. They do, however, indicate a close relationship to the organism occurring in thrush of the mouth and to the monilia psilosis isolated by Ashford from sprue. The absence of ascospores separate them from the endomyces and the presence of mycelium from the cryptococcus so that if we accept Castellani's classification, they belong to the genus monilia. Moniliae were recovered from 10 patients who had an erosia associated with paronychia, from 13 with erosia alone, and from 9 with paronychia alone

Dishwashing and handling fruit have been shown to be predisposing features

**MORPHINE.**—C F Schmidt and A E Livingston (Proc Phys Soc Phila (Jan 21) 1929) found that dogs do not readily become tolerant of small doses of morphine. Apparently dogs show tolerance to morphine more rapidly if the concentration is increased or is higher from the start, and as far as the narcotic (cerebral) effects are concerned, within 24 hours, if the animal is given an initial overwhelming dose

**PHYSIOLOGICAL ACTION**—J T Gwathmey (J A M A 91 1774 (Dec 8) 1928) stated that with the addition of magnesium sulphate, the analgesic action of morphine could be enhanced. He states that magnesium sulphate synergizes with almost any drug with which it is compatible, by prolonging its action, deepening its effect and reducing fever or acting in other ways.

The effect of morphine on the metabolism of 4 rabbits was studied by C C Lund and E B Benedict (New England J Med 201 345 (Aug 22) 1929) and each rabbit was observed in the normal, hyperthyroid and hypothyroid states. A large dose of morphine caused a drop of about 10 per cent in the metabolism of the normal rabbit. The same dose caused a drop of 20 per cent in the metabolism of a hypothyroid rabbit, while no change was produced on the metabolism of the hyperthyroid rabbit.

**EXCRETION**—W A Wolff, C Riegel and E G Fry (Proc Phys Soc Phila (Dec 17) 1928) found that tolerance to morphine is not characterized by significant increase in capacity to destroy morphine. Normal dogs, when given a single dose of morphine the size of which varied between 25 mg and 200 mg ( $\frac{1}{3}$  to 2 grains) per kilo ( $2\frac{1}{2}$  pounds) of body weight, eliminated 11 to 23 per cent in the urine, feces contained from traces up to 7 per cent. A series of 4 dogs tolerant to doses ranging from 25 mg to 60 mg ( $\frac{1}{3}$  to  $\frac{5}{8}$  grain) which had been kept on a morphine regime for periods varying from 7 to 543 days, gave 10 to 14 per cent elimination in urine, 2 to 6 per cent in the feces.

**POISONING—TREATMENT**—K H Erb (Munchen med Wchnschr 75 1376 (Aug 10) 1928) found that inhalation of carbon dioxide would stimulate respiratory centers in cases of alkaloid poisoning. A case is cited of a man, aged 23, with inoperable cancer of the pharynx, whose respirations were markedly depressed by overdoses of morphine. High-grade cyanosis appeared, the pulse became small and rapid, and breathing ceased. Artificial respiration was not successful, and lobeline had no effect. Insufflation of carbon dioxide through tracheotomy tube was started and patient was revived.

Carbon dioxide inhalation in morphine poisoning is also reported by J R McCurdy (J A M A 92 1927 (June 8) 1929). A mixture of 10 per cent carbon dioxide and 90 per cent oxygen is used for relief of respiratory failure of almost any source, such as surgical shock, anesthesia, cardiac conditions, pneumonia, carbon monoxide poisoning, and morphine poisoning.

**MORPHINISM.**—The effect of morphine on the physical fitness of the drug addict has recently been studied in an excellent piece of investigative work by A B Light and E G Dorrance (J A M A 92 2102 (June 22) 1929). The studies consisted in measuring the weights, heights and vital capacities, making thorough physical examinations and subjecting the patients to Schneider's test of physical fitness during the administration of sufficient amounts of morphine to supply their needs, and comparing these observations with normal standards. The patients, numbering nearly a hundred, were addicts, for the most part, of the "underworld" type, and consequently likely to exhibit the more severe symptoms. They have been unable to detect any marked physical deterioration or impairment of physical fitness aside from the addiction *per se* in the series of cases of opium addiction studied during the administration of morphine. They believe that the existence of considerable emaciation in certain cases is caused by the unhygienic and impoverished life of the addict rather than any direct effects of the drug. The encouraging feature lies in the indicated possibility of excellent physiological restoration if all the psychologic and sociologic antagonisms can be corrected.

The effects of abrupt withdrawal of morphine in human addicts was studied by A B Light and E G Dorrance (Arch Int Med 44 1 (July) 1929). Abrupt withdrawal of morphine for a period of 24 hours in 4 addicts resulted in the appearance of mild withdrawal symptoms. These symptoms were accompanied by negligible changes in the pulse rate, leukocytic count and basal metabolic rate. Changes in behavior and irritability would indicate that mental suffering begins before physical suffering. In 10 addicts prompt withdrawal of morphine resulted in the appearance of

severe withdrawal symptoms. A definite leukocytosis was found in 8 of the 10 cases, concentration of the blood in all cases and a slight rise in the cholesterol of the blood in 7 of the 10 cases. Albuminuria was found in 2 cases. The pH of the blood, the urea nitrogen and the sugar showed no changes. Considerable loss in weight occurred during the 48-hour withdrawal period.

**TREATMENT**—Narcosan has not been found of any added value to the treatment of drug addiction by G. S. Johnson (Colorado Med. 24: 347 (Nov.) 1927).

A. Scheuer (Med. Welt 2: 458, 1928) states that a good active **sex gland preparation**, when correctly employed, is of use in the treatment of morphinism. The administration of the medicament over a long period of time—at least for 2 months—is essential for the result.

### MORTALITY STATISTICS.—

Probably the greatest exponent of mortality statistics in the United States today is Raymond Pearl of the School of Hygiene and Public Health at Johns Hopkins University, Baltimore. This life-long worker in the biology of living matter has contributed more to plotting out the course of mass life than any other American investigator. One of the commonest problems in the United States today is that of the effects of indulgence in alcoholic stimulants on life duration. Many statements are to be found in the public utterances of those for and those against the present situation. It has remained for Pearl to make a statistical analysis of the relation between the use of *alcohol and longevity*. Some 5248 persons comprise the raw data from which the following conclusions emerge. They are quoted from a paper by Pearl printed in the *International Clinics*, volume 3, series 38, p. 28 (Sept.) 1929, in an article entitled, "Alcohol and Life Duration."

The moderate ingestion of beverages containing alcohol did not shorten life in a fairly large and homogeneous sample of the working class population in the city of Baltimore. On the contrary, somewhat lower mortality rates and greater life expectation was exhibited by the moderate steady drinkers. While the superiority is not great in the male drinkers, and may hence not be statistically significant, it certainly gives no support to the idea that alcohol always shortens life, even when ingested in moderate amounts. On the other hand, it was found that those persons who were heavy drinkers showed significantly increased rates of mortality as well as lessened longevity when compared with the group of moderate drinkers or total abstainers. When the 2 groups, heavy and moderate drinkers, are pooled together, the resulting mixed group shows higher mortality rates and lower life expectation than the abstainers as a class. This agrees with the life insurance companies experience. This result, however, only occurs because risks of the heavy drinkers which are impaired are mixed with the actually superior moderate drinkers, thus bringing down the averages. The foregoing observations were confirmed by Pearl from autopsy material from the Johns Hopkins Hospital. Here again moderate drinkers and total abstainers had the same average duration of life. Pearl concludes by stating that experimental evidence adduced from several workers and on widely different species of animals agrees in showing a beneficial effect of alcohol upon the race. It seems that alcohol has a selective action on germ cells and developing embryos.

in that the weak and defective are killed off while the sound and strong are allowed to live and perpetuate the race. It has long been thought that the use of alcohol by the parents tends to produce weak and defective progeny. This idea is not supported by the experimental work which has been done. Pearl examined evidence from human families with this in mind and came to the same conclusion.

#### MORVAN'S DISEASE.—

While most neurologists limit the conception of Morvan's disease to the form of syringomyelia with marked trophic disturbances in the fingers, some, including Oppenheim would broaden the meaning of the term to include other agencies, such as leprosy, which produce similar lesions. That meningeal adhesions as well as intramedullary cavitation may be factors in the pathogenesis of this condition was emphasized by J. J. Puente, R. Orlando and E. Dowling (Rev. Soc. de med. int. y. tisiol. 3:370 (Nov.) 1927) report a case. Their patient, a girl with anesthesia of the hand, weakness, ulcerations and Horner's syndrome, made a good recovery following surgical release of arachnoid adhesions. The site of the lesion was localized by lipiodal examination. Aspiration of the syringomyelic cavities has also been suggested as a radical therapeutic measure. (See SYRINGOMYELIA.)

#### MUMPS.—BLOOD PICTURE—

F. Jahn (Deutsche med. Wchnschr. 54:1974 (Nov. 23) 1928) reported observations made on 7 cases of uncomplicated mumps. The patients, whose ages ranged between 2 and 17 years, were kept in the hospital until recovery was

complete. Blood counts were made every second day. In no instance was a leukopenia found. Two of the patients had a normal white blood count, and 5 had a moderate leukocytosis, which disappeared in the fourth week of the illness. Five of the patients had a lymphocytosis and 2, an eosinophilia.

**COMPLICATIONS.**—A parotid abscess following mumps was reported by S. Wahl (Am. J. Dis. Child. 36:177 (July) 1928) in an infant aged 20 months. Fluctuation of the parotid gland was observed 15 days after the initial swelling (33 days after exposure to mumps). When the gland was incised, a considerable amount of blood and some gas escaped. There is a disagreement in the literature as to whether suppuration of the parotid gland is ever a true complication of mumps, or whether the etiology is entirely distinct from this disease.

Orchitis is generally recognized as a common complication of mumps. However, the condition may occur without primary involvement of the salivary glands. M. Rabinowitz and V. Seligman (M. J. and Rec. 130:215 (Aug. 21) 1929) reported a case of primary orchitis involving the left testicle, 14 days after exposure to mumps. R. Danielson (J. A. M. A. 89:2041 (Dec. 10) 1927) reported a similar case of mumps orchitis in an adult who gave a history of having had mumps in childhood. This patient had been repeatedly exposed to mumps occurring in his own family. While many observers believe that the virus of mumps reaches the testicles through the blood stream, L. Antupit (Tr. Sect. Obst., Gynec. and Abd. Surg., A. M. A. 1927; J. A. M. A. 92:411 (Feb. 2) 1929) believes

that the testicle becomes involved by an ascending infection through the urethra

*Neurologic complications* occurring in mumps may be classified as follows (1) meningitis, (2) encephalitis, and (3) neuritis. The last form may be demonstrated clinically by involvement of the second, sixth, seventh, eighth, eleventh and twelfth cranial nerves, by diffuse polyneuritis or by localized neuritis. W S Colless and M A Rabinowitz (Arch Int Med 41 61 (Jan) 1928) reported a case of mumps, complicated by polyneuritic quadriplegia, bilateral facial paralysis and meningitis, which ended in complete recovery. L Moretti (Gaz d osp 49 524 (Apr 29) 1928) described a bilateral facial paralysis in an adult which developed during convalescence from an attack of mumps. While improvement was slow, eventually the function of both facial nerves was completely restored.

**MYOPIA**—F A Newman (Am J Ophth 12 714 (Sept) 1929) advances a theory of the *etiology* of acquired axial myopia and makes definite recommendations for its prevention. He suggests that the primary lesion in this disease is to be found in the elastic membrane of the choroid, that this membrane may be weakened either by heredity or by poor conditions of nutrition in early life, either prenatal or postnatal, and that the "exciting cause" of the myopia, acting on this weakened elastic membrane, is excessive accommodation and the use of the eyes under poor conditions. Children of myopic parents demand extra care.

According to the author, not more than 60 per cent. of the accommoda-

tion should regularly be employed. This means, that in writing or reading, the eyes should be distant from the work, at 7 years, 23 cm, at 9 years, 26 cm, and at 11 years, 28 cm. Home lessons should not be given before the age of 12 years, and during the critical age of puberty excessive study is to be avoided. Frequent routine examinations are necessary to detect commencing myopia. When static refraction is  $+1.00$  diopter or under, or when a low grade of myopia is already present, active treatment is indicated. This includes rest of the eyes by avoidance of close work and by paralysis of accommodation for the space of 2 months, attention to nutrition, and the prescription of physical exercise. By these means it is hoped that many children may be saved the necessity of a life-long addiction to corrective lenses.

**MYXEDEMA—DIAGNOSIS**—Incipient myxedema should be considered when signs of lessened physical and mental activity are complained of, particularly in cases of degenerative arthritis, hyperesthetic, rhinitic, and angioneurotic edema. For instance, a case is reported in the literature of a girl with thick voice and occasional dysphagia. A general thickening of the soft palate and uvula, and much infiltration of the epiglottis existed. Tuberculosis was eliminated. A diagnosis of localized myxedema was made, and small doses of fresh thyroid brought about great improvement. Menorrhagia may be also a symptom of myxedema.

When myxedema develops before the natural menopause, menorrhagia is present in a high percentage of cases. Further, myxedema is a com-

mon sequel to artificial menopause when this has been induced for menorrhagia without apparent local cause. In addition to the usual cerebellar symptoms occasionally present in myxedema, Westphal's paradoxical contraction and the myodystonic electrical reaction of the anterior tibial and long peroneal muscles have recently been found. Kraus, Brock, and Sloane (Am. J. M. Sc. 178:548 (Oct.) 1929) have made a critical analysis of the association of congenital myxedema with mental and neuro-muscular disorders, particularly a condition they define as thyro-neural dystrophy. It is a familial, possibly congenital, disorder affecting the central neuro-muscular control. It is exhibited as chorea, ataxia, athetosis, static fits, rigidity, abnormal reflex changes, postural defects, and signs referable to disturbed function of the vegetative nervous system associated with a variable degree of mental and thyroid defect.

The disorder may imitate advanced cerebral diplegia. Nystagmus, squint, and stuttering may exist. It is suggested that the unknown cause is common to both the thyroid and the neural dystrophy. When thyroid gland is administered early, benefit accrues. Holzman (Am. Heart J. 4:351 (Feb.) 1929) believes that there are probably 2 groups of cases of *myxedema heart*, those in which permanent changes in the myocardium have been produced by the disorder and which consequently fail to improve under thyroid medication, and those responsive thereto because of negligible involvement.

It is not unknown for myxedema to appear following treatment for thyro-toxicosis. This may be either

permanent or temporary. The former reaction is not of frequent occurrence, according to the Thompsons (J. Clin. Investigation 6:347 (Dec. 20) 1928), somewhat less than 1 per cent, following subtotal thyroidectomy and about 4 per cent after x-ray therapy. It may occur following untreated toxic goiter. A noteworthy feature is the tendency for the post-x-ray myxedema to be delayed in appearance up to 5 days after treatment. A myxedema of temporary duration may be delayed from 1 to 1½ years.

**TREATMENT.**—Thyroid therapy should be periodically discontinued so that information may be had whether the disturbance is temporary or permanent. Grigsby (Texas State J. Med. 24:562 (Dec.) 1928) is of the opinion shared by many that thyroid is dangerous in myxedema unless the patient is constantly supervised. He begins with 0.016 Gm (0.25 grain) *t i d* increasing by 0.016 Gm (0.25 grain) every 3 or 4 days until 0.065 Gm (1 grain) is administered. Most patients do well on 0.065 to 0.19 Gm (1 to 3 grains) *t i d*. If more than 0.3 Gm (5 grains) are taken without change in metabolic rate, **thyroxin** beginning with 0.5 mg ( $\frac{1}{130}$  grain) daily and gradually increasing is indicated. In cases occurring at or near the menopause, better results are occasionally obtained by combining the thyroid with ovarian extract. This replacement therapy must continue indefinitely. To prevent overstimulation, the thyroid can be omitted 1 week of every month. Nobel and Kornfeld (Ztsch. f. Kinderh. 48:216 (Aug. 12) 1929) obtained striking results in the treatment of *congenital*

*myxedema* with **thyroxin** in a girl aged 17 years. Growth was increased 7 inches during 18 months, ossification of the carpal and tarsal bones

went on to completion, the characteristic changes in the soft parts disappeared, and the mental condition improved

## N

**NAIL. INGROWING TOE.—TREATMENT**—Fraser (Brit M J 1 383, 1929) takes an oval piece of soft **tin foil** and glues it to the nail, so that the edge of the tin foil wraps around and projects under the irritating edge of the nail, he then **treats the skin ulcer**. [This treatment would seem to be quite conservative, but hardly applicable to some of the cases that come under observation, where there is so much soft tissue overlap and exquisite tenderness, that the manipulation required would hardly be acceptable to the patient. The nail does not grow in, the soft tissue overlaps the nails, hypertrophies, ulcerates and becomes infected. Our best results have been obtained by **resection** of the concealed or overlapped nail, removal of the piece and packing back the resulting cavity and overhanging tissues with small piece of gauze wet with **tincture of iodine**, changed every third day. This causes rapid shrinking of the hypertrophied skin and granulation tissue. When thoroughly healed, a broad shoe should be ordered as the shoe is the cause in nearly all of the cases. The nail should be carefully watched for several months.—Ed.]

**NARCOTIC ADDICTION.—TREATMENT**.—A Lambert (J A M A 93 1297 (Oct 26) 1929) reports that (1) none of the substances forming the basis of the so-called specific cures for drug addiction bring about amelioration or

shortening of the withdrawal symptoms. Such drugs as narcosan, belladonna, atropine and scopolamine, have been thought to be specific cures. The results from scopolamine are similar to those from atropine—a slight lessening in the diarrhea but no amelioration of other symptoms. Restlessness and prostration are more marked, and some patients show symptoms of delirium when taking atropine or scopolamine. The craving for narcotics after the withdrawal stage is not stopped.

(2) Depressants of the central nervous system are ineffective or not practical as substitutes for opium derivatives.

(3) The quickest and simplest method of stopping the addiction is that of **abrupt withdrawal** of the narcotic taken. Among the advantages of this method are the shortness of time involved, 3 days as a rule, the avoidance of any complicated system of medication, an easier prevention of the addict surreptitiously obtaining narcotics during the period, with a striking feeling of relief when the withdrawal stage is over. The disadvantages are the suffering involved, mild in many instances but very severe in others, and the prostration and collapse, which may cause death. As has been pointed out, the abrupt withdrawal treatment should be limited to those addicts who on careful examination are found to have no serious organic degeneration or disease, are not of advanced age, and are not suffering from marked malnutrition.

(4) The most humane form of treatment is that of giving progressively decreasing doses of morphine. Two weeks at least should be allowed for this **reduction treatment**. The advantages of this method are the absence or great diminution of severe suffering and its safety as regards collapse and danger to life. The disadvantages are the time involved, the absence of the favorable psychologic effect of the abrupt with-



drawal, and the greater and more prolonged vigilance required to prevent the addict obtaining his narcotic

With this summary, the committee recommends that all addicts undergoing treatment be under capable medical supervision, that those whose general condition warrants it be subjected to abrupt withdrawal, and that those not included in this class be given the reduction treatment

**NASAL CAVITIES.**—*Perforation of the nasal septum* in chromium workers is quite common. In the process of plating, chromic acid particles are carried into the air and are deposited in the nose on the mucous membrane. F W Dixon (J A M A 93 837 (Sept 14) 1929) reports 18 cases of perforation, in 1 industrial plant. In other establishments where the same process was employed, but where ventilation was adequate, this trouble was not encountered. In Dixon's cases, most of the workers were unaware of the perforation. Bleeding was not severe and this occurred only when the crusts were forcibly expelled. In all cases the perforation was limited to the cartilaginous portion of the septum.

The first symptoms experienced on entering the chrome room were sneezing and a burning sensation in the nose. After a few days, bleeding was encountered, later, blocking and crusting became the final factors of discomfort. In the cases in which perforation was encountered in those employed less than 6 weeks, all had been employed in similar work in other plants previously.

In regard to prophylaxis and treatment the following measures are helpful

1 **Proper ventilation** of the tanks and rooms. Thereby avoiding the irritation

2 **Employees must be warned not to pick at the nose**

3 **The wearing of masks and gloves is helpful**

4 In those already afflicted the free use of **white petrolatum** to the **septum** caused all unpleasant symptoms to disappear

H I Shulman (Am J Dis Child 36 352 (Aug) 1928) reports a case of *Vincent's infection* of the nose in a boy aged 3 years. The symptoms of Vincent's infection of the nose are a persistent mucopurulent discharge and a greenish membranous slough. The discharge has a fetid odor and tends to excoriate the skin. He obtained results by **swabbing** the nose with half-strength **hydrogen peroxide**, followed by 5 per cent **chromic acid**, which is kept in the nostril for a full minute.

N Dott and D Guthrie (Proc Roy Soc Med (Sect Laryngol and Sect Otol) 20 85 (Sept) 1927) make a differentiation between normal glial tissue in the nose due to an embryonic rest and neoplastic gliomatous tissue which has eroded through the cribriform plate. The authors report a case of erosion of the cribriform plate by a spongioblastic frontal *glioma*. In cases of long standing intracranial tension, cerebral herniae into the minute natural spaces of the dura are common. The authors believe that if these herniae become involved in a neoplastic process, the latter will almost certainly penetrate the dura and by pressure erode the cribriform plate into the nose.

O Bartoli and L Bianchi (Arch ital di otol 38 609 (Oct) 1927) have made an extensive study of *polypi* from 20 patients. They found that the covering epithelium varies from

columnar, through cuboidal, to squamous epithelium. In polyp<sub>i</sub> of recent formation, and especially in single polyp<sub>i</sub>, the epithelium retained the typical nasal columnar formation, but as the polyp<sub>i</sub> increased in age, these cells became flatter until in very old polyp<sub>i</sub> a single layer of flattened cells covered the polypus. The connective tissue appeared normal except that plasmocytes were found near the periphery and especially near the glands. The vessels often showed thickening of the walls with hyaline degeneration. Glands were certainly present in young polyp<sub>i</sub>, but tended to degenerate in polyp<sub>i</sub> of older standing. Elastic fibers were limited to the walls of the vessels. The pedicles of the polyp<sub>i</sub> consisted of bundles of fibers with vessels which did not show any hyaline degeneration, there were no traces of glands in the pedicles. The authors found no excess of leukocytes in the polyp<sub>i</sub>, but considered that a number of them passed through the covering epithelium to enter the mucus which covers the polyp<sub>i</sub> and bathes the interior of the nose. They do not consider that there is any evidence that these polyp<sub>i</sub> are neoplastic, but are convinced that they are entirely inflammatory. Recurrences are believed to be due to incomplete treatment originally, and the absence of metastases or of cachexia confirms this opinion. The authors think that the bleeding polypus of the septum, the nasopharyngeal fibroma, and choanal cystic polypus may be neoplastic, but that all other nasal polyp<sub>i</sub> are inflammatory.

*Fissure* of the nose, according to Richard L. Sutton (J A M A 91: 567 (Aug 25) 1928), is comparatively common. He has seen 27 cases in a

period of less than 5 years. Practically all of his patients were women between the ages of 35 and 55 years. In the majority of instances only 1 side of the nose was involved, the lesions occurring at the anterior angle of the opening and giving rise to considerable pain and discomfort.

In the author's hands the most effective agent is a needle-pointed electric cautery. With this modern "*microbrenner*" the raw surface, previously put on the stretch by means of a nasal speculum, is carefully ironed out. Afterwards, a dressing of ointment is applied.

**NASOPHARYNX.**—According to J. A. Glover (Proc Roy Soc Med (Sect Epidemiol and State Med) 21: 95 (July) 1928), over 80 per cent of sickness occurring in school children is transmitted by droplet infection to the upper respiratory tract. The increase in illness among children of school years he attributes to the prevalence of influenza following the epidemic of 1918 and also to overcrowding from the increased demand for education. Most frequently found among the diseases communicated by droplet infections are influenza, the common cold, chills, pyrexias of unknown origin, tonsillitis, and sore throat.

Glover is uncertain as to the value of vaccines for *prophylaxis*, but thinks that they may cause a diminution in the incidence of complications. When vaccines are used they should be given before the period of susceptibility, *i e*, not later than November. In addition to prophylaxis by vaccine, the writer advocates (1) efforts to prevent children from going back to school with influenza or minor colds.

after the mid-winter holidays, (2) a checkup on the temperature of the patient for at least 3 weeks following the acute stage, (3) immediate isolation of all students exhibiting pyrexia or catarrh, (4) cutting down the duties of the student, (5) hot baths and showers taken during the day or after games should be followed by a cold shower, (6) avoidance of chilling, (7) increased provision for dry clothing. Since infection usually occurs in sleeping quarters, it is important that the proper spacing of beds and thorough cross-ventilation in dormitories be cared for.

H. Ernberg (*Acta paediat* 7 87 (Nov 11) 1927) observed that there was an increase in the number of patients in an infants' hospital complaining of nutritional disorders, digestive disorders, and similar affections which he believed were primarily of pharyngeal origin. He noted further that the cases occurring in the winter, compared with those in the summer, were both greater in number and more severe in degree. The author stresses the importance of a full history and careful examination in studying each case, with a search for information concerning preceding colds and similar disorders. In addition to examination of the posterior fauces and retropharynx, it is important to examine the sides of the neck for possible lymphadenitis and the ears for any indication of otitis media.

Ernberg (*ibid*) suggests that infections of the upper respiratory tract and complications are the most frequent and important causes of epidemics among infants occurring in hospitals and also in homes. He stresses the wisdom of advising mothers

concerning hygienic and alimentary precautions. Obstruction to breathing may be due to adenoids, polypi, cysts, mulberry enlargement of the posterior ends of the inferior turbinates, fibroid or malignant tumors.

F. K. Hansel (*Arch Otolaryng* 9 - 12 (Jan) 1929) states that *malignant tumors* occurring in the nasal pharynx are usually located in the fossa of Rosenmüller and from this region they soon invade neighboring structures so that at least 50 per cent of the symptoms and findings may be extranasal in origin. These symptoms are variable, depending, of course, upon the structure affected. All of the cranial nerves may be involved, but the sixth one is the nerve usually affected. Due to the small size of the original or primary growth, diagnosis may present considerable difficulty. The writer is of the opinion that the condition should be suspected in each case of unexplained palsy or irritation of the cranial nerves, and also in any case of otherwise unexplained cervical glandular enlargement. These tumors are so malignant that palliative measures in the way of therapy using radium or x-rays offers only a grave prognosis.

Soukup (*Casop lék česk* 69 156 (Nov 9) 1928) calls attention to the fact that benign *chordomata* of the nasopharyngeal region grow, as a rule, without the exhibition of any special clinical signs, even if they expand to the size of a nut. Ordinarily they are found accidentally at post mortem examination. Benign chordomata differ from malignant chordomata as to size, infiltrating ability and destruction of adjacent tissues. Chordomata, as a rule, extend toward the brain and symptoms are due to

the pressure of the tumor on the nearby tissues. Death is the result of bulbar involvement. Diagnosis is difficult or impossible without histological examination. Prognosis is, of course, unfavorable. Chordomata may be primary, arising in the nasopharyngeal region, developing usually from embryonal rests, or they may arise intracranially from small chordomata at the clivus, showing no clinical signs of injury to the nervous system. In some cases, however, spontaneous growth may be noted simultaneously from an intracranial and a hypobasal center.

Pathological processes arising in the nasopharynx frequently spread to and involve the middle ear. Grave conditions may arise from this extension. Occasionally, a lateral sinus infection may result and cause a bacteremia or a lateral sinus thrombosis, with extension to the middle fossa of the skull, with a local meningitis developing into a generalized meningitis. When the diagnosis of these distressing sequelæ to nasopharyngeal involvement has been made, treatment is usually of no avail. The principal measures are prophylactic in every case of nasopharyngitis.

In cases of *difficult nasal respiration* A. Schuller (Ann Otol, Rhin and Laryng 38 109 (Mar) 1929) maintains that x-ray examination may show as the cause some deformity at the base of the skull or upper cervical vertebral region as, for example, hyperkyphosis of the skull base, assimilation of the atlas, or depression of the middle fossa in craniostenosis. In selected cases, **orthopedic therapy** may cause the deformity to be diminished or cleared up, and thereby relieve the nasal obstruction.

**NEPHRITIS, ACUTE.—ETIOLOGY.**—J. Gray (J Path and Bact 31 191 (Apr) 1928) reviews cases and reports on animal experiments, the results of which yield much evidence in favor of a bacteriotoxic origin in acute nephritis, though it falls short of absolute proof. Clinical investigation and post-mortem evidence agree in showing that some variety of streptococcus is the organism most commonly associated with acute nephritis. Bacterial multiplication in the kidneys is not a feature of non-suppurative nephritis, except probably in acute interstitial nephritis. In the other varieties ("glomerular," "glomerulotubular" and "tubular"), the bacterial factor is provided by lysis of organisms trapped in the glomeruli with consequent release of endotoxin. Experimental nephritis produced by simple crystalloid chemical substances is always tubular with minimal dosage, and this distribution is explicable on the basis of the "modern" theory of renal function. Alleged "glomerular" crystalloid poisons are really primarily tubular in incidence. Toxins, being colloids, are not filtered through the healthy glomerular tuft and so are concentrated in the glomeruli by withdrawal of fluid in the filtrate. Hence, the nephritis produced by them is initially glomerular. The successive stages in acute nephritis are outlined according to a classification made by Gray.

A case of *amebic nephritis* in an infant is reported by A. Van Cutsem-Franco (Bruxelles-med 8 711 (Mar 25) 1928), the only outward manifestation of the condition being hematuria. The 3-glass test showed that the blood was coming from the kidneys. Microscopic examination of

the urine disclosed a great many *amebæ*. Eight injections of **emetine** cleared up the hematuria and caused the *amebæ* in the urine to disappear.

Werboff (Ztschr f Urol 22 597 (Aug) 1928) asserts that both *tonsillitis* and *appendicitis* often lead to nephritis, hence frequent examination of the urine is imperative in these diseases. The nephritis is a metastatic affair manifested only by pathologic sediment in the urine. A severe hematuria should call to mind *appendicitis*. **Appendectomy** is followed by a speedy retrogression of the nephritis. Three cases of chronic glomerulonephritis following *tonsillitis* in children, aged 10, 11 and 15 years, respectively, are cited. **Tonsillectomy** was followed by marked improvement of the patients' health. A case of glomerulonephritis caused by *appendicitis* is also reported. Removal of an inflamed appendix led to the disappearance of all symptoms of nephritis.

When the primary focus of infection is in the *tonsils*, V Kollert and E Suchanek (Wien klin Wchnschr 41 620 (May 3) 1928) believe there may be found somewhere in the body an inflammatory focus that is of primary importance for the renal disease. Under these conditions the peritonsillar tissue, particularly the glands lying in front of and behind the submaxillary gland, will frequently be found involved. When this is the case, the results of *tonsillectomy* are likely to be disappointing. If *tonsillectomy* is to be done in the presence of very severe peritonsillar disease, special measures must be taken to prevent spread of the infection.

**TREATMENT**—T G Moorhead (Brit M J 2 515 (Sept 22) 1928)

states that the giving of saline injections intravenously, subcutaneously or in the colon, in uremia is of doubtful value. He has not found Fischer's solution, both intravenously and by rectum of value, and the rectal injection of the highly alkaline solution which he recommends, containing as it does, 10 Gm ( $2\frac{1}{2}$  drams) of sodium carbonate per liter (quart), is extremely irritating. The injection of plain **sodium chloride** and of **sodium citrate solution** can be justified only as a diluent of retained toxins, and may be useful in this way, even though it is realized that the kidney finds difficulty in excreting both chloride and sodium ions. On the whole, Moorhead is inclined to recommend their use in the form of colonic injections after thorough evacuation of the colon. As regards drugs, **morphine**, so long under suspicion in uremic cases, is now recognized as both safe and satisfactory in checking repeated convulsions.

*Syphilitic*—G Petges, P Joulia and R David-Chausse (Paris méd 1 224 (Mar 2) 1929) report 3 cases of acute syphilitic nephritis in patients with primary syphilis. The albuminuria (up to 77 Gm of albumin per liter) disappeared after about 15 days of treatment by intravenous injections of from 0.005 to 0.02 Gm ( $\frac{1}{12}$  to  $\frac{1}{3}$  grain) of **mercuric cyanide**, and thus the use of arsenic and bismuth, contraindicated in the presence of albuminuria, was made possible. Of all the mercury preparations, mercuric cyanide is the one that, in addition to its spirocheticidal properties, has a marked diuretic effect and is well tolerated by the kidneys, therefore, it should be the medication of choice in cases of *syphilitic albuminuria*.

**NEPHRITIS, CHRONIC.—**  
**ETIOLOGY.**—In a series of 77 cases studied by C H Peckham (Bull. Johns Hopkins Hosp 45 176 (Sept) 1929), a relatively large percentage, 22 1, were found at the end of a year, following an eclamptic attack, to present a definite chronic nephritis. He says that much more nephritis follows severe than mild eclampsia, and it is more likely to develop after the antepartum type. The latter is particularly true when the eclampsia develops at some time before the pregnancy has reached term. The percentage incidence of nephritis increases with the age of the patient, and multiparous women are more prone to it than primiparous. Out of 5 cases of repeated eclampsia, nephritis developed in 3 after the second attack. None of these patients gave a history indicative of chronic kidney disease prior to the convulsive attack. There appears to be no connection between the number of convulsions and subsequent nephritis. However, it develops relatively less frequently when the duration of the convulsive attack is under 6 hours. There seems to be a direct relation between the amount of hypertension and albuminuria and later permanently impaired kidneys. With a pressure of 200 or more and albuminuria of at least 10 Gm, three-fourths of the patients ultimately develop nephritis. Chemical examination of the blood at the time of eclampsia gives no indication of what may develop later. Neither the duration from onset of eclampsia to delivery, the length or type of labor, nor the type of anesthetic employed at delivery can be correlated with a later nephritis. A slow return of blood-pressure to normal is

suggestive. However, nephritis may develop within the year, even in patients who are discharged with a normal pressure and normal urine. On the other hand, hypertension and albuminuria persisting throughout the puerperium do not necessarily indicate that the kidneys will sustain permanent harm. The outlook for a subsequent pregnancy following eclampsia is less favorable than is generally believed. Even the most adequate prenatal care will not always prevent eclampsia. Consequently, all toxemias should be carefully watched since even the mildest types may occasionally eventuate in an altogether unexpected eclamptic attack.

**PATHOLOGY.**—In a study of the arterial supply of the kidney in nephritis, G Baehr and S A Ritter (Arch Path 7 458 (Mar) 1929) have been able to demonstrate by injection methods, a very considerable reduction in the smaller arterial and arteriolar divisions of the vascular tree in chronic diffuse nephritis. They consider the inflammatory changes in the vessels to be relatively important in the production of the final contracted state of the organ. The study of 4 cases of early diffuse glomerulonephritis failed to reveal as yet any gross alterations in the arterial supply of the kidney.

Thrombo-angioneurotic changes of the kidneys in chronic nephritis are described by B Sternberg (Arch Int. med 44 272 (Aug) 1929). In one of a group of cases the characteristic feature is endarteritis with necrosis of the vessel wall and subsequent changes in the renal parenchyma. The vascular changes are not restricted to the kidney, but are found also in vessels of the other organs of

the body Clinically, these cases are characterized by a comparatively rapid development of renal insufficiency Changes of the eye-grounds are conspicuous The condition is found in young or middle aged persons in contradistinction to cases described as arteriosclerotic nephrosclerosis The following nomenclature is suggested *renal thrombo-angionecrosis* for the more acute form and *angionecrotic nephrosclerosis* for cases of longer duration

From a study of the *cholesterol* content of the blood in 100 cases of chronic nephritis, I Gavrilă and C Berariu (Arch d mal de l'app digestif 18 645 (June) 1928) conclude (1) In the majority of cases of chronic nephritis a more or less marked hypercholesteremia occurs, (2) there is no relation between the height of the arterial pressure and the cholesterol content of the blood, (3) likewise, there is no relation between the degree of the hypercholesteremia and the retention of nitrogen or chlorides, (4) there does not seem to exist any direct relation except between albuminuria and hypercholesteremia, patients with the most marked hypercholesteremia also present the most marked albuminuria, but this relation is not absolute, (5) when a series of cholesterol determinations is made in the same patient during treatment, it is found that the variations in the cholesterol content of the blood do not parallel the variations in the arterial tension, the nitrogen or chloride content of the blood, or the albuminuria

H Thiers (J de méd de Lyon 10 281 (Apr 20) 1929) studied the *chlorine content* of the blood, and of the cerebrospinal fluid in various forms of

nephritis and has come to the conclusion that, contrary to the ideas of Vidal, retention of chlorine may be observed in all forms of nephritis, as well as in nephritis with edema, as in nephritis with azotemia, or with arterial hypertension In chlorine retention, the amount of chlorine in the blood serum may be normal, increased or decreased, but the amount of chlorine in the erythrocytes is always increased and the ratio of the chlorine of the plasma to the chlorine of the erythrocytes

$$\frac{\text{Cl plasma}}{(\text{Cl erythrocytes})}$$

is always decreased, this constitutes the veritable sign of chlorine retention In nephritis with azotemia caused by salt deficiency, retention of chlorine is observed in the tissues, though the amount of the chlorine in both the blood serum and the erythrocytes is decreased Many factors (such as diuresis, dyspnea and acidosis) besides nephritis are involved in the production of chlorine retention. The chlorine content of the cerebrospinal fluid is not of great interest because it varies with the changes in the chlorine content of the blood serum The results of these studies have a practical interest for the diet of patients with nephritis, and especially for patients with azotemia caused by salt deficiency

The *hemoglobin percentage* and *blood cell count* in Bright's disease, myocardial insufficiency and hypertension is considered important by B Ashe (Arch Int Med 44 506 (Oct) 1929) who states that anemia is constantly present with renal insufficiency, however the latter may be produced, and closely parallels the degree of func-

tional impairment. Anemia may, of course, be due to some other cause, such as cancer, along with the renal anemia. In most cases, this second source of the anemia will hardly escape clinical observation. The actual nature of an observed anemia is obtained only when the hemoglobin percentage is observed as well as the blood count. It is the relation between these 2 observations, in other words the determination of the color index, which provides the clue as to whether the kidney, the heart or the blood-vessels are most deserving of aid and attention. In the case of renal insufficiency, the average color index value was found to be approximately 0.9. However, there is variation, in cases of marked and maximal insufficiency, the anemia may be of a pernicious type with a color index of 1 or even higher. A low color index with low hemoglobin percentage is indicative of congestive myocardial failure, while a low color index with high hemoglobin is characteristic of cases manifesting cerebral lesions.

T. Addis (Am J M Sc 176 617 (Nov.) 1928) defines Bright's disease as any condition in which more than the normal amount of protein and more than the normal number of casts are to be found in the urine coming from both kidneys. The upper limit of protein excretion normally is 30 mg per 12 hour period. Counts on 74 apparently healthy medical students show an average of 1040 casts per 12 hours with a range of from 0 to 4270, so that over 5000 is considered abnormal. The average rate of red blood cell excretion was 65,750 per 12 hours varying from 0 to 425,000. The white cells and epithelial cells were excreted at an aver-

age rate of 322,550 per 12 hours. The urea ratio determinations give a true indication of the still functioning renal tissue.

From the above studies, it would seem that Bright's disease may be divided into 3 groups to which the names "arteriosclerotic," "degenerative" and "hemorrhagic" have been provisionally attached. By comparing the clinical findings with the renal lesion, he has found that the *arteriosclerotic* group are characterized by an arteriosclerosis of the renal arteries and by a patchy fibrosis of the cortex, that the *degenerative* group show granular, fatty or necrotic changes in the tubule cells, while the *hemorrhagic* group are distinguished by the presence of inflammatory lesions in the glomeruli. As a result, a classification which was at first only a summary statement of the observation that some kidneys bled, others excreted an excess of degenerated cells, and still others neither bled nor desquamated cells, begins to acquire an anatomic significance. The evidence at hand indicates that bleeding means an active glomerular inflammation, that an increased excretion of epithelial cells means tubular degeneration, and that a continuing slight excess of casts and protein and cells in the urine may mean a renal arteriosclerosis. The observations, then, tend toward the conclusion that the hemorrhagic cases through all their diverse stages are one disease, the arteriosclerotic cases are another and separate disease, and the degenerative group represent renal effects of many different diseases.

The clinical syndromes of nephritis are grouped by F. D. Murphy (Wisconsin M J 28 206 (May)



1929) as follows: (1) The urinary syndrome, (2) the nitrogen retention syndrome, (3) the hypertensive syndrome, (4) the edema syndrome, and (5) the uremic syndrome. The individual patient may present all at one time, or he may have any single one, or any possible combination of the five.

The modern pathological classification of kidney disease is based on changes occurring in the tubules, glomeruli and arteries so that the following corresponding divisions are recognized: (1) nephroses, (2) glomerulo-nephritis, and (3) renal arteriosclerosis.

The functional value of the proximal convoluted tubule is considered by W. De B. MacNider (Am. J. M. Sc. 178 449 (Oct) 1929), who reports experiments on 72 dogs with uranium nitrate which induced renal injury showing the selective affinity for the tubular epithelium. He made comparative studies of the functional and anatomical changes in 4 groups of these animals.

Group 1, represented dogs over 7 years of age, and none survived the acute injury longer than 14 days.

Group 2, comprised dogs which, after having developed a severe acute nephritis, returned to a complete functional normal. The epithelium of the convoluted tubules showed 2 entirely different types of repair. The first type is characterized by the formation through regeneration from less severely injured convoluted tubule cells of an epithelial replacement very similar to cells normal for this part of the tubule. The second and more usual type of repair was by an entirely different type of flattened cell atypical for this location in the tubule.

Group 3, were dogs which failed to return to normal after having developed an acute nephritis and gave evidence of functional alterations, classing them as having a chronic nephritis.

Group 4, were dogs which had either completely recovered functionally, or had developed chronic nephritis. They were given a second injection of uranium, and it was found that where the repair to the previous injury was predominantly of the atypical flattened type of epithelial cell, the resistance to the injury was much greater. The suggestion is made that this type of repair may, in part, constitute a defense mechanism in the tubule against further injury.

**DIAGNOSIS.**—Following a study of the precipitin test as an adjunct in the diagnosis and prognosis of nephritis, R. M. Tandowsky (Am. J. M. Sc. 178 63 (July) 1929), states that antigen prepared from inflammatory kidney substance seems to contain sensitive bodies that are apparently lacking in an antigen prepared from non-pathologic kidney substance. The urines giving negative precipitin reactions were apparently free from nephritic protein. The protein which they contain had evidently taken origin from sources other than the kidney. It appears from this study that the presence of protein in the urine in the vast majority of cases takes origin from tissue sources other than the kidney.

The Diazo test in nephritis was found by S. H. Polayes, M. Lederer and W. Z. Fradkin (J. Lab. and Clin. Med. 14 229 (Dec) 1928) to have no constant parallelism with the phenolsulphonphthalein excretion. A positive Diazo test, apparently, is not

so ominous a prognostic sign if there are no other evidences of renal disease or blood nitrogen retention

**PROGNOSIS.**—A Dias (Presse méd 36 1236 (Sept 29) 1928) makes the following suggestions with regard to the prognostic significance of blood urea determinations in chronic nephritis (1) A single urea determination is valueless, therefore a series of determinations should be made, (2) the urea determinations should be made at the same time as the determinations of the other elements important in the prognosis, such as the creatinine, the alkali reserve, and the calcium Although the urea curve usually parallels the creatinine curve, this is not always so, (3) the urea content of the blood may increase from causes outside the kidney cardiac insufficiency or an intercurrent acute infection, for example, (4) in patients with edema the urea content of the blood is masked by the hydrema, which must be eliminated before one can obtain the true urea value, (5) the increased blood urea may be transient and due to a congestion of the kidney or to an acute attack during the evolution of a chronic nephritis In acute nephritis the blood urea is of no prognostic value because even when the amount of blood urea is extremely large it may drop rapidly In acute nephritis the kidney is diseased but the rest of the organism is not, in chronic azotemic nephritis, on the contrary, the kidney and the entire organism are diseased In the prognosis, therefore, subsidiary facts furnished by the various systems must be taken into consideration, (6) thus, although the amount of blood urea remains fixed, the prognosis may vary according to

the indications furnished by other tests, (7) if the blood urea can be caused to disappear with a suitable diet, the prognosis is good, if it cannot, it indicates a serious metabolic disturbance, (8) transient azotemia is of no prognostic significance, permanent azotemia is serious, progressive azotemia is fatal The blood creatinine curve is of great prognostic value Since creatinine is an endogenous product, almost the entire percentage of which is independent of the diet, and since its curve is influenced very little by circulatory disturbances or by the quantity of urine excreted, it constitutes a valuable clinical guide, particularly if its increase is progressive

From a study of many cases of chronic nephritis, the author draws the following conclusions (1) Progressive creatininemia is fatal if its figure reaches 8 or 9 mg, (2) high creatinine figures, coinciding with a calcium decrease, are a warning of convulsive accidents, (3) as a rule, the creatinine curve parallels the urea curve, (4) when the urea content decreases and the creatinine content increases, it is the latter that is of primary importance, (5) in acute nephritis the increase in the creatinine is much less marked than that of the urea, (6) in creatinine determinations, autophagia is the chief cause of error, it is eliminated by prescribing a carbohydrate diet, (7) here, as in the study of the urea, many determinations must be made to obtain an exact curve, (8) since in azotemic nephritis the disturbed nitrogen metabolism dominates, and since the creatinine is an endogenous end-product and the most exact expression in the blood of renal insufficiency,

its prognostic value is considerable, (9) in chronic nephritis a progressive creatininemia of from 8 to 10 mg is fatal, regardless of the figure for urea

**TREATMENT**—Double renal de-capsulation for painful nephritis was performed by R Darget (J d'urolog 27 41, 1929) in a patient showing oliguria for a period of 5 years. The phenolphthalein elimination was 22 per cent and the blood urea was 35 Gm. Three months after operation, the phenolphthalein elimination was 69 per cent, and 2 years later, following a second operation for scar tissue, the blood urea was 0.31 Gm and the phenolphthalein elimination 50 per cent.

*Chronic syphilitic nephritis*, as stated by E Hess (Am J Syph 11 438 (July) 1927), should be treated with extreme care. The author recommends the use of 2 c c ( $1\frac{1}{2}$  dram) of a 1 per cent solution of **mercurochrome** intravenously every day for 4 or 5 days, with careful checking up on the urine and the general condition and feeling of the patient. If the patient's condition remains stationary or improves somewhat, the dose of salvarsan is gradually increased up to the maximum. It may be necessary to revert back to the small intravenous dose of mercurochrome, or to use **mercury** in some other form intravenously, intramuscularly, or orally. If mercury is not well tolerated, the author recommends the use of **bismuth** (hypoloid bismuth metal), 0.2 Gm (3 grains) intramuscularly every day or so, depending on the condition and tolerance of the patient. The general and dietetic requirements are the same as for nephritis from any other cause. All focal infections should be cleared up sur-

gically. The treatment must be individualized.

### NEPHRITIS IN CHILDREN.—

There is no universally accepted and entirely satisfactory classification of nephritis. Some terminologies are based upon clinical symptoms, others on pathologic findings and still others on a combination of both. There are three main pathologic types of nephritis: *glomerular*, *tubular* and *interstitial*, in which, respectively, the glomeruli, tubules, and the connective tissue are the primary seat of the most prominent visible damage. However, the total injury is hardly ever so sharply localized, and, in any instance, such terms probably define the real situation only in the early stages or when the damage is mild, severe damage, even if localized in 1 portion of the histologic unit, commonly leads to secondary impairment of the function of the remaining portions. There are 2 clinical features by which the primary pathologic changes can usually be diagnosed, namely, the presence or absence of *hematuria* and *edema*. The following diagram is merely a convenient schematic representation of nephritis, based upon the primary site of damage. It is to be emphasized that as the disease progresses, mixed forms occur (W Davison and R Salinger, Bull Johns Hopkins Hosp 41 329 (Dec) 1927).

Classification of  
Nephritis in Children

Hematuria (with or without edema).	No hematuria	
	Edema	No edema
Glomerular nephritis, (acute and chronic)	Tubular nephritis (acute and chronic nephrosis)	Inter- stitial neph- ritis

The differentiation of glomerular nephritis as well as tubular nephritis into the acute and chronic forms, is based almost entirely on the duration of the illness. As far as children are concerned, there is no valid excuse for these 2 subdivisions. This division of tubular nephritis into acute and chronic types seems to add confusion to the medical literature concerning nephrosis. For example, Davison and Salinger (*loc cit*) used the term "nephrosis" as synonymous with chronic tubular nephritis, while K. Blackfan and B. Hamilton (Bull Johns Hopkins Hosp 41 322 (Dec) 1927) employed the same term to denote the acute form of tubular nephritis.

**ETIOLOGY.**—The causative agents of nephritis have long been thought, in the usual case, to be micro-organisms, toxins, or a combination of both. Simple chemical poisons are recognized as causal in occasional isolated cases. Bacterial multiplication in the kidneys is not a feature of non-suppurative nephritis, except, probably, in acute interstitial nephritis. In the other varieties—glomerular, glomerulo-tubular, and tubular—the bacterial factor is provided by lysis of micro-organisms, trapped in the glomeruli with consequent release of endo-toxins. Toxins, being colloids, are not filtered through the healthy glomerular tuft, and are concentrated in it. Consequently, the type of nephritis produced under these conditions is, initially, glomerular. Experimental nephritis produced by simple crystalloid chemical substances in minimal doses, is always tubular (John Gray, J Path and Bact 31 191 (Apr.) 1928).

Etiologically, *glomerular nephritis* has been classified as both primary and secondary, although there is doubt whether the primary form occurs. In the secondary type the nephritis appears either in the course of the primary disease, or, as is more frequently the case, it follows the latter in from 1 to 4 weeks. Because of this lapse of time between the initial and secondary involvement, such a nephritis may incorrectly be spoken of as the primary rather than the secondary type. The more common acute infections in which glomerular nephritis appears, are tonsillitis, scarlet fever, whooping-cough, pneumonia, influenza, pyelitis, impetigo, and occasionally dental caries. It may also follow removal of the tonsils too soon after an acute infection. In most instances, some form of the streptococcus is apparently the specific agent (J J Weil, Clin Med and Surg 36 173 (Mar) 1929).

The onset of acute and sub-acute glomerular nephritis in 40 patients observed by W. Longcope, P. O'Brien, J. McGuire, P. Hansen and E. Denny (J Clin Investigation 5 7 (Dec) 1927) was preceded or accompanied in 85 per cent of the cases by an infection, such as tonsillitis, sinusitis, bronchopneumonia and scarlet fever. Cultures obtained from obvious or possible foci of infection in 32 cases showed hemolytic streptococci of the B type in 68.7 per cent and streptococci of the A type in 12.2 per cent of the patients. B. S. Hirschberg and M. E. Ssucharewa (Jahrb f Kinderh 122 340 (Jan) 1929) found that in a group of 845 patients with scarlet fever, 167 developed nephritis. This complication occurred more commonly in boys than in girls.

*Tubular nephritis* (nephrosis) Degenerative changes in the kidney tubules may occur from a variety of causes. Certain acute infectious diseases, such as pneumonia, typhoid fever, and particularly diphtheria, inorganic substances, such as mercuric salts, organic toxins found in jaundice, diabetes, and the like—all give rise to a pathologic lesion in the kidney which may rightly be termed nephrotic, but which, unaccompanied by the full clinical picture, does not justify the diagnosis of nephrosis. (W. Boyd, *Canad M A J* 16 349 (Apr) 1926) Nephrosis is in all likelihood a systemic disease, in which the kidney is secondarily affected, either by the causative toxemia itself or by alterations in metabolism producing the general disorder. The specific cause is still obscure. Streptococcic infections, according to Gladys Boyd (*Canad M A J* 19 46 (July) 1928), play no part in the production of nephrosis. The micro-organisms most commonly isolated in this disease were staphylococci and the most frequent infectious disease which had occurred in this group of patients, was measles.

*Interstitial nephritis* (sometimes denoted chronic diffuse nephritis) is a progressive renal disease, with protean clinical manifestations, but with a common pathologic picture when the disease has run its course. According to Gladys Boyd (*Canad M A J* 21 679 (Dec) 1929), 2 main clinical types of the disease are seen in childhood: (1) those in which the symptoms or signs or both follow an acute nephritis, (2) those in which no suggestive symptoms of sufficient severity occur to direct attention to the kidney, until chronic changes

have already taken place. In the first group, it is almost impossible to set a time limit at which the acute inflammatory process has passed over into the chronic one. Usually, however, when symptoms or signs persist longer than 2 months, or recur after a temporary cessation, chronicity has become established. The second clinical type consists of 2 groups. First are those in which the disease runs a benign course, with little downward progress over a period of years. In the other group the first symptoms are uremia, headaches, blurred vision or blindness, and arteriosclerosis is found to be present.

**PATHOLOGY.**—*Tubular nephritis* (nephrosis) K. Blackfan and B. Hamilton (*loc cit*) found in most cases of tubular nephritis, a decrease of the fixed base of the serum, and, in the acid radicles, a corresponding decrease of bicarbonate and undetermined acids. It was impossible to state which factor was primary, and which secondary. It seemed, however, a rather plausible hypothesis that the loss of protein through the kidneys was the cause of the low serum protein, and that the albuminuria, therefore, is the primary change to which all the others are secondary. F. W. Schlutz, W. W. Swanson and M. R. Ziegler (*Am J Dis Child* 36 756 (Oct) 1928) observed that globulins as well as albumins are eliminated by the kidneys. At times the albumin-globulin ratio was reversed, and the globulins were high. The total plasma protein was somewhat reduced. It was noted that a large amount of urinary protein was usually accompanied by a decrease of blood protein. H. A. Christian

(J A M A 93 23 (July 6) 1929) stated that the most common cause for blood protein deficit is marked and prolonged albuminuria. The presence of this albumin in the urine, this author believed, is due to the passage of albumin through the walls of the blood-vessels, probably the glomerular capillaries, because of functional changes in the colloid membrane.

In (lipoid) nephrosis, the question often is raised as to whether the cholesterolemia or the albumin loss furnishes the explanation of the edema. The cholesterol does not appear to be a result, but rather a cause, of renal abnormality. The relation of cholesterol to edema is not well understood. It is known that hyper-cholesterolemia may exist in other conditions, such as jaundice or diabetes, without edema, and again it has been demonstrated that cholesterol in nephrosis does not vary proportionally with the amount of edema. Edema in nephrosis, then, according to T. I. Bennett (Lancet 1 637 (Mar 31) 1928) suggests that there is pathologic change in tissues other than in the kidneys, which is not the result of nephrosis, although it is more than probable that the renal and extra-renal damage have a common causal basis. Christian (*loc cit*) stated that after there had been a prolonged period with protein deficit in the blood, then edema, relative increase in blood globulin at the expense of the albumin, hypercholesterolemia and lowered basal metabolism will appear, though not always in the same order nor in the same degree. It has been noted that patients with nephrosis seemed improved when the blood proteins in-

creased (Schlutz, Swanson and Ziegler *loc cit*).

**PROGNOSIS.**—*Glomerular Nephritis*—Four or 54 per cent of 74 patients with acute glomerular nephritis reported by J. D. Lyttle and L. Rosenberg (Am J Dis Child 38 1052 (Nov) 1929) died. The prognosis in nephritis complicating scarlet fever is, as a rule, good, both from the point of view of life and of complete recovery. Hirschberg and Ssucharewa (*loc cit*) found that 65 per cent of their patients made a complete recovery, 144 per cent showed great improvement, 36 per cent showed some improvement, and 113 per cent died. In 57 per cent the outcome was unknown. F. S. Patch and I. M. Rabinowitch (J A M A 90 1092 (Apr 7) 1928) observed that in spite of high urea values, symptoms of uremia were usually absent when the creatinine values were normal, or nearly so. It was also found that though high creatinine values and symptoms of uremia were accompanied by positive diazo color reaction, this was not necessarily present with high urea values. The clinical significance of these observations lies in the demonstration that urea studies, unaccompanied by observations on creatinine and the diazo color reaction, should not be relied on in estimating progress or prognosis. According to Lyttle and Rosenberg (*loc cit*), cases with uremia had a mortality of 23 per cent as compared to 7 per cent in those without uremia.

*Tubular Nephritis*—Few reports of complete recovery in tubular nephritis are to be found in the literature. However, according to Davison and Salinger (*loc cit*), it would seem that

a fair proportion of children with this disease recover, although it cannot be attributed to any particular type of treatment. Of 26 cases of tubular nephritis admitted to the Harriet Lane Home during the past 15 years, 6 of the 20 patients regarding whom definite information could be obtained, recovered, and 5 of them have remained well for more than 7 years. Six of the 20 died, in 8 the disease was still active at the time of the report. Of 8 cases of this same disease, observed by Lyttle and Rosenberg (*loc cit*) 5 died, a mortality of 62.5 per cent.

The 2 most important factors in the prognosis, according to Gladys Boyd (*loc cit*), are the *age* of the patient, and the *mode of onset*. Practically all children under 18 months of age, recover completely, unless the cases are luetic in origin, or a fatal secondary infection occurs. The rate of recovery and its completeness vary with the rapidity of development of the symptoms. Fifty-five per cent of the patients of all ages with an acute onset, recover, whereas, only about 20 per cent of the cases which have developed slowly have a similar termination. The absence of complicating infection, improves the prognosis. Gladys Boyd (Canad M A J 19 555 (Nov ) 1928) stated that the concentration test is the only 1 of the renal function tests found to be a prognostic aid. Persistently low specific gravity of the night urine and a decrease in its daily variations warrant a prognosis of chronicity, regardless of what the clinical condition of the patient may suggest.

*Interstitial nephritis* (sometimes denoted chronic diffuse nephritis). Repeated exacerbations, whether they

are characterized by hematuria or edema, always indicate a progressive lesion and make the outlook worse. The persistence of a slight rise of blood-pressure, or its gradual increase, is significant of progressive impairment of kidney function. As has already been mentioned, a determination of the concentrating power of the kidney gives most valuable information. It should be mentioned that chronic interstitial nephritis in early life may be accompanied by bone changes resembling rickets. About 60 such reports are on record. Especially prominent as a symptom in such cases is genu valgum. Infantilism or dwarfism are constant accompaniments of chronic kidney disease in infancy and childhood.

**TREATMENT**—*Tubular Nephritis*—T. I. Bennett (Lancet 1 637 (Mar 31) 1928) stated that **salt-free diets** are of uncertain value in edema. This author believes that the idea of a salt-retaining kidney as an explanation of edema, must be dismissed as a myth, for, if there is any type of kidney which is capable of retaining salt, it is not the one associated with edema. On the whole, salt-free diets, according to Bennett are more likely to be effective in cases of cardiac failure than in cases of so-called nephritic edema.

**Subcutaneous injections of oxygen** were administered by W. Mikulowski (Wien klin Wchnschr 42 1048 (Aug 8) 1929) to a patient with hemorrhagic nephritis. One hundred c.c. (3½ ounces) of oxygen were injected on each of 3 successive days. The cyanosis, restlessness, and high blood-pressure disappeared, and the patient finally recovered.

The **sugar treatment** was employed

by W Hirschfeld (Arch f Kinderh. 82 245 (Nov ) 1927) in the treatment of a series of cases of nephritis. No effect was noted in any of the patients in regard to the symptoms of albuminuria, or hematuria that could be attributed to the sugar. The treatment did, however, appear to have value in those cases with uremia, or in which uremia was imminent.

Gladys Boyd (Canad M A J 19 665 (Dec ) 1928) recommended the high protein, low fat, and low carbohydrate diet in the treatment of nephrosis. As much as 2 to 3 Gm (30 to 45 grains) of protein per kilo ( $2\frac{1}{2}$  pounds) of body weight should be given.

Diuretics must be accorded first place in consideration of drug therapy, even though they are of doubtful value in removing edema. In infants, in the absence of nitrogen retention, urea in 1 to 2 Gm (15 to 30 grains) doses, 3 times a day, may be found beneficial. S Amberg (Am J Dis Child 35 335 (Feb ) 1928) also found urea of value in relieving edema. Ammonium chloride 1 to 3 Gm (15 to 45 grains) 2 or 3 times a day is often recommended. Thyroid extract has been found to relieve symptoms in some cases, probably by stimulating the general metabolism. Amberg (*loc cit*) however, observed no beneficial results following the administration of thyroid in the case of a 6 year old boy. In chronic cases with the edema increasing, in spite of the administration of previously mentioned diuretics, novasurol may be administered subcutaneously. This drug should not be employed in the acute stage of the disease, or in any other form of nephritis. One-fourth

c c (4 minims) of novasurol may be given as the initial dose. The amount is gradually increased every second day until 1 c c (16 minims) is given at the 3d or 4th injection. The medication should be discontinued upon the appearance of diuresis.

J K Calvin (Am J Dis Child 37 223 (Jan ) 1929) treated 3 cases of nephrosis with thyroid extract, ammonium chloride, high protein diets, laxatives, reduction of fluid intake, low salt intake, injection of foreign protein, and the like, with but temporary relief.

In cases of cerebral edema, spinal puncture may be performed provided the fluid is drawn off carefully to prevent impaction of the medulla. In addition to the diuretics previously mentioned, magnesium sulphate in 1 per cent solution may be given intravenously at the rate of 1 to 2 c c (16 to 32 minims) per minute. The total amount of fluid should not exceed 10 c c ( $2\frac{1}{2}$  drams) per kilogram ( $2\frac{1}{2}$  pounds) of body weight. One or 2 ounces (30 to 60 Gm ) of 50 per cent magnesium sulphate should be given per rectum every 4 hours. Patients with anuria who do not respond to the usual diuretics may be given 300 to 500 c c of a 20 per cent glucose solution intravenously. Fluids accumulating in the body cavities in quantities large enough to produce respiratory and cardiac embarrassment and which are not relieved by diuretics, should be removed by paracentesis.

*Interstitial Nephritis*—The treatment of this type of nephritis is symptomatic, except for measures directed towards the removal of possible causal foci of infection.



**NEPHROLITHIASIS.** See KIDNEY

**NEPHROSIS.**—Nephrosis is described by H A Christian (J A M A 93 23 (July 6) 1929) as having the following important features insidious onset, marked edema, decreased basal metabolism, oliguria, marked albuminuria, decreased blood proteins with relative increase in globulin reversing the usual albumin globulin ratio, lipoidemia, good phenol-sulphonphthalein excretion, no increase in non-protein nitrogen of the blood, cylindruria but no hematuria, doubly refractive lipoid droplets in the urine, and normal blood-pressure. The term "nephrosis" is limited to renal degenerative lesions in contrast to "nephritis" which indicates inflammatory and proliferative lesions of the kidney.

Eighteen adult cases are summarized with the clinical course and post-mortem findings consistent with the diagnosis of nephrosis. The average duration of the disease was 8.8 months from the onset of edema to death. In 15 of these cases, at the end there was evidence of acute infection, and of these, in 8 there was infection with the pneumococcus.

In adults the changes found in pure nephrosis are seldom seen at autopsy. Pure nephrosis, however, is not infrequently seen in children, usually superimposed on a chronic pneumococcus infection in the upper respiratory tract.

The most common cause for low blood protein is a marked and prolonged albuminuria due to a renal lesion. In patients dying early of infection the glomeruli show very slight or no demonstrated lesions, while there are extensive degenera-

tive changes in the tubules. The probable source of the albuminuria is in the passage of albumin through the walls of blood-vessels, most probably, glomerular capillaries, a functional change in a colloid membrane of which the microscope gives no evidence.

Clinically, nephrosis may be used as a name of a syndrome, but it does not mean that a definite and single form of pathologic lesion will be found in the kidney, but rather there may be a degenerative lesion of the tubule with normal appearing glomeruli, there may be amyloidosis, or lesions that will progress into typical chronic glomerular nephritis.

From the pathological standpoint, E T Bell (Am J Path 5 587 (Nov) 1929) considers *lipoid* nephrosis as a form of glomerulonephritis in which the glomeruli are injured but their capillaries are only partly obstructed, so that they continue to function.

**TREATMENT**—It is important to liberalize the diet with sufficient protein to replace the loss of albumin from the blood, so long as renal function will permit of its utilization without retention of non-protein nitrogen. The Journal of Organotherapy 13 14 (Jan-Feb) 1929) states Epstein suggests a high protein, low fat, moderate carbohydrate diet with a minimal salt intake. Thyroid or thyroxin should be given in sufficient dosage to elicit a metabolic response. The dose required being high in proportion to the depression of the basal metabolic readings, 15 to 60 grains (1 to 4 Gm) daily of thyroid are often required over long periods of time.

Parathyroid has also been used with success by D S Lewis and W

de M. Scriver (Ann Int Med 2 66 (July) 1928) in treating nephrosis

Liver diet has also been used in *lipoid* nephrosis and M. Grossmann (Wien Klin Wchnschr 41 450 (Mar 29) 1928) has seen marked diuresis and increased sodium chloride excretion on a salt-free liver diet.

**NEURALGIA.**—E. Beyer (Munch med Wchnschr 76 1545 (Sept 13) 1929) asserts that neuralgia and myalgia are most easily contracted when the body is at rest, especially during sleep, since the blood-pressure, pulse rate and oxygen intake are considerably reduced. If a person is not sufficiently protected against drafts or cold, or if a part of the body becomes uncovered, the chilling often produces a neuralgia or myalgia. To prevent these conditions, care should be taken that the sleeping room is well ventilated, but drafts avoided. The author points out that night dresses often do not cover the body sufficiently and that during the colder seasons, the bedcovers, as well as the night dresses, should be heavy enough to prevent chilling.

Andre Thomas (Presse méd 37 919 (July 13) 1929) describes 2 cases of *neuralgia of the arm during the menopause*. The first, a woman, aged 42, presented a picture of acroparesthesia localized in the right arm, not due to cervical ribs or overdeveloped transverse processes of the vertebræ. The only outward sign was a slight swelling, comparable to that in myxedema. Periods of amenorrhea and endocrine disturbances are recognized by Thomas as the cause of this condition. In a second patient, in her thirties, neuralgic symptoms became evident several months after total

hysterectomy, necessitated by the presence of an ovarian cyst. Here, again, a slight swelling of the arm was evident, particularly in the evening. The pain was indefinite, extending over the entire left side, the skin of the arm being especially sensitive. The thyroid was slightly enlarged. **Organotherapy** improved the condition of both patients.

P. Dalche (Gynécologie 27 5 (Jan) 1928) discusses "*habit*" *neuralgias of the female genital organs*, and records cases in which the pain was of great intensity and accompanied by a persistent burning sensation which did not yield to treatment. This kind of pain was always intensified by the slightest touch and by voluntary movements as walking. After a long period of misery the patients become anxious and irritable from loss of sleep and appetite. The author compares this type of pain with that occasionally noticed after trauma of nerves, particularly the median and sciatic nerves. This similarity has led some observers to attribute the neuralgia to a sympathetic syndrome following a lesion of the periarterial plexuses. Whatever the cause, there is no doubt that no organic lesion could be found even with the most thorough examination. The patients were not hysterical or psychasthenic. The theory that a particular nerve may develop a habit of registering pain is considered by the author. He argues that, presumably, some initial condition starts the pain and the nerve continues habitually to record pain even after the cause has ceased to operate. Dalche suggests that this may be possible without any accompanying mental derangement. He remarks that such patients often ex-

plain their ills poorly, and that the present means of investigation are too incomplete to allow an accurate diagnosis to be made. Treatment included **psychotherapy, drugs, thermal waters, light, diathermy, ionization, and surgical treatment.** In 1 woman, relief was obtained by section of the **internal pudendal nerve.**

A Thomas (Médecine 10 97 (Feb) 1929) believes that meralgia paresthetica is only one of the forms of neuralgia of the *external cutaneous femoral nerve*. Thus, for instance, in certain forms of this condition, there was observed the absence of the **pilomotor reflex** which is present in meralgia paresthetica and which indicates the **intraspinal localization** of the nerve lesion. In the case reported by the author, there were observed severe shooting pains and anesthesia in the region of the distribution of the **external cutaneous femoral nerve**, with the presence of the **pilomotor reflex** in a patient with retrocecal abscess and appendicitis. In all forms of this condition the presence of the **negative mustard test** would indicate the degeneration of the nerve due to the localization of the lesion in the spinal ganglions.

Obstinate *painful spasm of an amputation stump* is reviewed by A. L. Thomas and R. Amyot (Rev. neurol (Mar) 1928) who give a vivid description of the vicissitudes that may befall a neuropathic person after amputation of an extremity. A woman, 28 years old, caught her right foot in the wheel of a motor cycle and sustained a compound dislocation of the ankle. On account of serious infection, an amputation below the knee had to be performed. The stump became extremely painful, hypersensi-

tive and the seat of clonus-like spasm brought on by a light touch, an emotion, or a sound. There were also painful and burning sensations referred to the amputated foot. **Periarterial femoral sympathectomy** in Scarpa's triangle was done with no result. General anesthesia and injections of novocaine into the stump only gave momentary relief. In view of a report by Monnier-Vinard of good result from injection of antitetanic serum in a similar case, this was tried but also without relief, and with many unpleasant by-effects. Resection of the sciatic nerve above its bifurcation and of the internal saphenous nerve did not relieve pain but the spasms were materially lessened.

**GLOSSOPHARYNGEAL NEURALGIA**—Byron Stookey (Arch Neurol and Psychiat 20 702 (Oct) 1928) made an excellent review of the subject of "Glossopharyngeal Neuralgia" which was first described by Weisenburg in 1910 and 1911. The condition is characterized by paroxysms of pain of overwhelming intensity which begin in the region of the tonsil and the base of the tongue and is referred to the region of the ear, usually in front of it, and occasionally down the neck. **Intracranial section of the dorsal root** will give complete and permanent relief in this condition. The author gives an excellent review of the surgical anatomy and the after-effects of section. Subjective signs of section are not complained of and relief from pain is complete.

J. A. Sicard (Rev. Neurol (Feb) 1928) reports a case of glossopharyngeal neuralgia relieved by **injection of alcohol (10 c c) into the middle constrictor muscle of the pharynx.** The

pain was completely relieved but paralysis of the soft palate and pharynx on that side was produced Sicard advises trying this injection before resorting to the more formidable resection of the glossopharyngeal nerve root

F K Hansel (Ann Otol Rhin and Laryng 37 440 (June) 1928) states that since 1920 when the first true case was reported by Sicard and Robineau, 20 cases have been reported The pain in this condition is identical with that of trifacial neuralgia, but begins in the throat, along the side of the pharynx, around the tonsil, or on the base of the tongue, and radiates to the region of the ear In all of the cases reported it has been unilateral There is usually a trigger zone and as a rule, the pain can be temporarily allayed by cocainization of that area Following intracranial division of the nerve, Dandy found no appreciable motor changes, but the sense of taste was lost on the posterior third of the tongue on the same side and there was a loss of sensation in the pharynx, except in the dome, which ended sharply at the midline No secretory disturbances were noted

**VIDIAN NEURALGIA**—A case of vidian neuralgia is reported by H H Vail (Arch Surg 18 1247 (Apr) 1929), in which there were paroxysmal attacks of severe stabbing and continuous pain which began on the left side of the nose and radiated across the face into the left eyeball, forehead, upper teeth, palate, ear, neck and shoulder Such pain is usually attributed to *neuralgia of Meckel's ganglion*, but by means of an operative opening in the sphenoidal sinus and examination by the nasopharyngoscope the patient was found to have

a sphenoidal sinusitis and later it was possible to demonstrate inflammation in the extensively pneumatized sinus with each attack of pain

**ATYPICAL NEURALGIAS OF THE FACE**—Mark A Glaser (Arch Neurol and Psychiat 20 537 (Sept.) 1928) gives a résumé of 143 cases of atypical, unexplained and unrelieved pain in the face, encountered in Frazier's clinic in Philadelphia, along with some 1200 cases of trigeminal neuralgia It is seen that the pain frequently is felt beyond the trigeminal area, particularly in the neck, shoulder and occiput The following conclusions are reached

- 1 The charts graphically represent the location, distribution and radiation of pain, the pain does not follow the direction of the several divisions or branches of the trigeminal nerve, but jumps across anatomic boundaries and extends often beyond the trigeminal zone into the neck and arm

- 2 The character of pain suggests disturbance of the sense of pressure

- 3 The pain is usually continuous, with exacerbations and occasional remissions

- 4 The pain is deep-seated rather than superficial

- 5 Sympathetic phenomena are frequently associated with the pain

- 6 The disease is more common in women than in men, and not a few of the patients are addicted to the use of drugs

- 7 There is no etiologic factor common to the majority Only 1 factor, the extraction of teeth, was common to any considerable proportion (15 per cent)

- 8 Drugs, extractions of teeth, drainage of sinuses, turbinectomies and all the forms of treatment advocated by cults have been tried and have failed

The list of the futile operations and other therapeutic procedures in these 143 cases is as follows

Injectations of alcohol in branches of the trigeminal nerve, 64, cocainization and injection of the sphenopala-

tine ganglion, 50, extraction of teeth, 48, sinuses, 48, supra-orbital and infra-orbital nerve avulsions, 24, nasal operations, 15, cervical sympathectomy, 12, stripping of the peri-arterial (carotid) plexus, 10, subtotal section of sensory root of trigeminal nerve, 11, mastoid operations, 5, pelvic operations, 5.

**TRIFACIAL NEURALGIA.**—Some interesting contributions have been made to our knowledge of the pathogenesis, symptomatology and treatment of trifacial neuralgia. F. K. Hansel stresses the importance of trigeminal disturbances of otitic origin (*Ann Otol Rhinol and Laryng* 38: 335 (June) 1929). Because of the intimate anastomosis between the trigeminal, facial, glossopharyngeal, vagus and tympanic nerves, there are several pathways for the transmission of disturbances from the middle ear and mastoid to the trigeminal areas. That the facial nerve probably plays the most important part in this transmission is indicated by cases of pain referred to the second and third divisions of the trigeminal nerve as the result of chronic otitis media and chronic mastoiditis. The author reports 3 such cases in which the pain was relieved by removal of the diseased process.

D. Kulenkampff (*Therap d Gegenw* (May) 1928) believes that the sympathetic nerve fibers play an important part in trifacial neuralgia. He ascribes the fact that the ophthalmic division is practically never primarily affected, to its superior blood supply. He also points out that trigeminal pain often follows cervical-sympathetic operations.

An interesting observation concerning the effect of trichlorethylene in

trigeminal neuralgia is reported by I. Oljenick (*J A M A* 91: 1085 (Oct. 13) 1928). During the late war certain symptoms were noted in men whose work involved the use of trichlorethylene and trichlorethane, among these were a slight swelling of the optic disc and particularly anesthesia of the trigeminal area, the motor part of the nerve showing no alteration. Hearing of this elective action of the drug for the fifth nerve, Oppenheim tried inhalations of it in trigeminal neuralgia with encouraging results in the first 12 cases. Oljenick states that the drug is now used at the University Hospital of Amsterdam in all cases of trigeminal neuralgia, but emphasizes that **chemically pure trichlorethylene** must be employed. It is a very strong-smelling liquid with the sweet odor of prussic acid. Giddiness and unconsciousness have followed its administration, so patients should be recumbent while inhaling it. Periods of exaltation may occasionally be observed, and sometimes pricking sensations in the hands and feet, these symptoms however, disappear quickly. The author adds that, though it is not known why trichlorethylene has this elective affinity for the fifth nerve, it has been proved that the sensitiveness of the irritated nerve decreases after repeated inhalation. The mode of the treatment is to *pour 20 to 25 drops of the drug on a small piece of gauze and inhale through the nose until the odor has completely disappeared*, this should be done *thrice daily*. Care should be taken not to touch the nose with the liquid. From the Amsterdam results Oljenick concludes that in a comparatively small number of cases the inhalation of trichlorethylene continued for some time, gives

excellent and lasting results. In some cases, the period of relief may be interrupted by renewed attacks, which usually are less violent than before. In most cases the treatment is a useful temporizing measure which by diminishing the number and vehemence of the attacks, allows the patient's general and local condition to improve. He adds that since the pain is only rarely uninfluenced by trichlorethylene, it should be tried in every case, furthermore, as it has no effect on other facial neuralgias, it may occasionally be of value in differential diagnosis.

Some interesting facts concerning the experimental, anatomical and pathological bases for the **surgical treatment** of neuralgia of the trifacial nerve are reported by I. Scalone (*Arch ital di chir* 18 69, 1927). The author investigated the causes of the neurotrophic disturbances, especially of the neuroparalytic keratitis, following retrogasserian neurotomy on 10 dogs. The operation resulted in complete insensitiveness of the whole region supplied by the trifacial nerve, and in no instance was there noted neurotrophic changes in the eye. Varying degrees of changes were found in the cells of the ganglion. Scalone concludes that the retrogasserian neurotomy will not cause neuroparalytic keratitis if the operation is performed with proper technic and care. When this condition does occur it will be transitory if the cells of the ganglion have been only slightly impaired—or permanent if they have been badly impaired. The root must be sectioned and not torn and the section must be done as far from the ganglion as possible.

C. H. Frazier (*J A M A* 89 1742

(Nov 19) 1927), *Ann Surg* 88 534 (Sept) 1928) and Byron Stookey (*Ann Surg* 87 172 (Feb) 1928) stress the following interesting and useful points in the problem of trifacial neuralgia.

1 There is abundant phylogenetic and embryologic evidence that the trigeminal nerve is made up of two entirely separate nerves—the ophthalmic and the maxillo-mandibular. It therefore appears safe to treat trigeminal neuralgia, not as a single condition but as two separate entities.

2 Neuralgia of the ophthalmic division of the trigeminal nerve occurs alone in less than 5 per cent of cases and is usually secondary to or referred from the maxillary division (Stookey). Frazier calls attention to the fact that at the outset, trigeminal neuralgia never involves more than one branch of a single division but that as time goes on it moves to the other branches of the same division and finally to other divisions. Later in the course of the disease when two divisions are involved it is almost invariably the case that in any given paroxysm the pain does not appear simultaneously but starts in the same division in which it first developed and is then referred to the other division. Moreover, Frazier has often observed that an alcohol injection into the division first involved is sufficient to control the pains in both divisions.

3 In view of the above, the authors make a plea for an early recognition and appropriate treatment of the trifacial neuralgias. In order to prevent the spread to more than one division of the nerve, Frazier regards the reaction of the patient to the proposal of operation as a great aid, since if the condition is a true trigeminal neuralgia the patient will readily consent to operation even when informed of the subsequent numbness of the face, mouth and eye, whereas if the pain is less severe he will hesitate to consent. The greatest difficulty in the differential diagnosis is from the atypical neuralgias (See **ATYPICAL NEURALGIA**). The injection of alcohol is also an aid in diagnosis, for when the pain is limited to 1 division of the trigeminal nerve, the patient will obtain at least temporary relief.

4 Both authors regard the operation as the best form of treatment in clear cases and alcoholic injections as the only alternative. Alcoholic injections of the nerve trunks are extremely painful procedures, give only temporary relief and are not without danger of serious complications. They should therefore be used only in special cases in which there is doubt as to the diagnosis or in which surgery is contra-indicated. The operation of choice is a subtotal section of the sensory root of the gasserian ganglion introduced by Frazier in 1915. This consists of section of the outer two-thirds with conservation of the ophthalmic portion. The primary purpose of this modification is to prevent trophic keratitis. Stookey adds a further refinement to Frazier's operation by his differential "section" of the dorsal root. He sections only the fibers of the division affected. The result is freedom from pain with minimal anesthesia.

A somewhat new conception of the anatomy of the trifacial nerve is disclosed by the newer operation practiced by W. E. Dandy (Arch Surg 18:687 (Feb.) 1929). The author reviews the history of the surgical treatment of tic douloureux and the results obtained in 88 cases treated according to his new technic. Dandy makes a unilateral suboccipital approach to the roots of the trigeminal nerve as they leave the pons. This is accomplished by emptying the cisterna magna and retracting the cerebellum. In reaching the fibers of the trigeminal nerve, care is taken to avoid injuring the acoustic nerve and the petrosal vein. Dandy states that this procedure is easier and quicker to perform than the temporal operation because the route is bloodless.

There was 1 death in his series due to hemorrhage from a vein along the sensory root. Three patients died of intercurrent diseases while they were still in the hospital. One died of

meningitis a week after the operation, 1 of intestinal obstruction and 1 of cerebral thrombosis.

In the beginning, the author cut the entire sensory root, leaving the motor root intact. Later, he began to do a differential section, leaving, in addition to the motor root, a few anterior fibers. Even in the earlier cases in which he practiced section of the entire root, a varying amount of touch and temperature sensation was frequently retained although pain sensation was invariably lost. Dandy believes this retained sensation was due to a number of sensory fibers accompanying the motor root which join the main sensory root outside of the dura.

When partial section of the root is carried out, the sensation over the entire face approaches the normal after the operation but the pain is cured irrespective of the branch originally involved. The author therefore believes that pain sensations are carried in the posterior part of the sensory root. He is convinced also that the peripheral branches of the trigeminal nerve are not accurately represented by subdivisions of the sensory root.

Another interesting conclusion is that the trigeminal nerve carries deep sensations of the face. Post-operative keratitis, which practically never occurred in the cases reviewed even when the whole sensory root was cut, is attributed by Dandy to injury of the Gasserian ganglion in the temporal operation. Lachrymation continues after section of the trigeminal sensory root.

The author's method is the only one applicable to cases of trigeminal pain due to invasion of the Gasserian ganglion by a malignant growth.

In one of Dandy's cases, in which there were no other symptoms than tic douloureux at the time the patient entered the hospital, an unsuspected tumor of the cerebellopontile angle was found and successfully removed.

**Treatment of Trifacial Neuralgia by Ionization of Various Substances**—C Rafailoff (Thesis, 1929) has found that many cases of trifacial neuralgia have been cured by **transfacial ionization with sodium salicylate and aconitine**, as well as by the **x-ray**. When these means fail, only **section of the trigeminal root** will give relief.

**POST-HERPETIC TRIGEMINAL NEURALGIA**—M M Peet (J A M A 92 1503 (May 4) 1929) stresses the persistence of pain after section of the sensory root of the Gasserian ganglion. He reports 2 cases of post-herpetic trigeminal neuralgia. He discovered only 3 cases among 400 patients with tic douloureux. This incidence is in accord with Frazier's finding of 1 in 520 cases of trigeminal neuralgia and Cushing's finding of 3 similar cases in a series of 332 Gasserian operations.

The condition is characterized by pain beginning with an attack of herpes over the same distribution, and the pain is of 2 varieties: (1) a constant dull burning ache, and (2) recurring paroxysms of extremely severe, sharp, shooting pain resembling that frequently associated with tumor of the Gasserian ganglion. There is often an objective loss of sensation over the painful area with corneal areflexia and disturbance of the motor branch of the trigeminal on the affected side. Especially in the aged, the pain may persist for years.

The fact that alcohol injections and sensory root sections do not give permanent relief indicates central in-

volvement of the lesion although none has been demonstrated. On the other hand, the ganglion itself shows both irritative and destructive changes.

P Lechelle and I Bertrand (Rev Neurol (July) 1928) also report a case of post-herpetic trigeminal neuralgia with complete section of the sensory root without relief. At necropsy the histologic study of the nervous system revealed that the Gasserian ganglion presented the typical small cell proliferation, characteristic of herpes zoster and pronounced degenerative changes in the descending root of the fifth, the cerebellum and other adjoining structures.

**NEURITIS.—ETIOLOGY AND PATHOLOGY**—G H J Pearson (Arch Neurol and Psychiat 20 366 (Aug) 1928) reports 31 cases of *central neuritis* found with clinical diagnosis as follows: Involutional melancholia, 2 cases, manic depressive psychosis, depressed type, 2, manic depressive psychosis, mixed type, 2, undiagnosed but probably toxic exhaustive psychosis, 1, psychosis with somatic disease, 5, senile dementia, 1, schizophrenia, paranoid type, 1, chronic alcoholism, 4, delirium tremens, 2, pellagra, 9, probable pellagra, but diagnosed general paralysis, 1, epilepsy, 1. As to symptomatology and course of the disease, he found that these cases did not differ materially from unselected cases of the analogous symptom complex without central neuritis except in the cases of pellagra, where every case showed the pathologic changes. He concludes that the disease is not caused by axonal injury, infection, starvation, exogenous or known endogenous toxins, nor is it a prelethal condition, it



seems to be the result of some subtle disturbance of metabolism that produces starvation and autometabolism of the cell. He states that the names applied to this condition are misnomers and advances "*primary cytolytic degeneration*" as a preferable term.

Leslie Hurley (M J Australia 2 156 (Aug 4) 1928) describes a case of *syphilitic neuritis* in a man aged 68 years, who, for 2 or 3 years previously, had been subject to attacks of pain with numbness and tingling in the right little finger, the ulnar side of the ring finger and along the ulnar border of the right hand and wrist. He had also noticed weakness of the right hand in the performance of the finger movements. Leukoplakia was noted on the inner aspects of both cheeks. Knee-jerks were almost absent. There were thin papery scars with pigmented margins on the legs. Blood-pressure was  $\frac{190}{105}$ . The arteries were thickened and impairment of sensation was noticed over the areas affected by pain and numbness. The Wassermann yielded no reaction on 2 occasions. Under anti-luetic treatment, however, improvement was fairly rapid. Samu Trunkl (Gyógyaszat, vol lxxviii, 1928) reports a case of bilateral facial paralysis during the primary stage of syphilis. The paralysis cleared up by treatment with arsphenamin and bismuth. A case of bilateral wrist drop with escape of the supinator longus muscle due to syphilis is reported by Pasteur Valéry-Radot (Rev Neurol (Dec) 1927). The case imitated lead poisoning and cleared up on antiluetic treatment.

Experimental studies by S Nicolau and I A Galloway (Compt rend Soc

de biol 98 31 (Jan 13) 1928), have proven that the virus of rabies is capable of producing an *interstitial neuritis* and that infection can spread both centrifugally and centripetally. Neuritis following antirabitic inoculation in man is described by P Remlinger (Ann de l'Inst Pasteur (Supp Conference Internationale de la Rag.) pp 133-143, 1928).

**POLYNEURITIS.—ETIOLOGY AND PATHOGENESIS**—T Ramer (Hygiea 91 305 (Apr 30) 1929) reviews the literature on polyneuritis and reports 4 cases. In his first case, probably due to pneumonia, the motor tracts were considerably more affected than the sensory, only deep sensibility being reduced. This, together with changes in the cerebrospinal fluid, pointed to a localization of the inflammatory processes in the nerve roots. The case is of special interest because of the relatively marked increase of cells in the cerebrospinal fluid and because of a constitutional weakness evinced in difficulty in pronouncing certain words. The patient recovered. In the second case, probably of rheumatic origin, the dissociation between the motor and sensory symptoms and the results of the spinal fluid test also indicated localization in the nerve roots. The course was protracted, with recurring symptoms in the joints, the prognosis poor. In the third instance, in which lumbar puncture had not been allowed, alcoholism and arteriosclerosis apparently were combined factors in the origin of the disorder. No improvement occurred. The last case is an instance of grave sensory motor polyneuritis, the disturbance was greater in the motor tracts than in the sensory

and in the latter only the sense of touch and deep sensibility were affected. Elective toxic action on the nerve fibers or, in view of the changes in the cerebrospinal fluid, a more central lesion presumably localized in the nerve roots, seems probable. The changes in the cerebrospinal fluid, at first marked, soon disappeared and the prognosis was regarded as favorable. The involvement of the central as well as of the peripheral part of the neuron is stressed by R. H. Thompson (Am J M Sc 175 807 (June) 1928) who reports 2 cases of peripheral neuronitis resembling Landry's paralysis.

Two cases of acute ascending paralysis from pneumococcus infection are reported by L. Hollaender and L. Karoliny (Munchen med Wchnschr 75 1549 (Sept 7) 1928). The first patient, a man 26 years old, gave a history of a cold a few weeks before the onset of paralysis which first involved the legs and 6 days later, the arms. Bulbar and pontine involvement set in on the eighth day. The sphincters were not affected. All tendon and superficial reflexes were absent. Sensation in the feet and legs was much diminished. Death occurred on the sixteenth day. Bronchopneumonia and acute enlargement of the spleen were the chief macroscopic post-mortem findings. Histologically, there were only trifling changes in the spinal cord and brain while examination of a large number of peripheral nerves revealed dense foci of round cells. The cells of the sheath of Schwann were swollen and the connective tissue of the nerve fibers were edematous. In sections of the inflamed nerves there were numerous gram-positive encapsulated diplococci of the typical appearance

of pneumococci. The second patient was a physician 25 years old with a very similar history and clinical picture, death occurring on the thirteenth day. The main gross findings at necropsy were suppurative tonsillitis, bronchitis, bronchiolitis and persistent thymus. In this case there was peripheral neuritis, with organisms of the pneumococcus type in the sections, but there were also more inflammatory changes in the spinal cord and brain. Foci of round-cell infiltration were present in all internal organs including the heart muscles. Both the outstanding neuritic process and the presence of diplococci in the nerves are features of great interest.

Five cases of multiple neuritis with clinical picture of acute ascending paralysis are reported by Alexandra Adler and Hans Hoff (Deutsche med Wchnschr 55 1880 (Nov 8) 1929), observed in Vienna in the summer of 1928, with similar course. Four of the patients died of paralysis of the diaphragm, while 1 survived to die 6 months later of pulmonary tuberculosis. Histologic examination in these cases revealed extensive degenerative changes in the peripheral nerves, most severe in the phrenic nerves. No cause was determined in these cases, but the authors at least feel justified in excluding the virus of epidemic encephalitis which has been considered the causative factor in similar obscure cases observed in France.

M. Faure-Beaulieu (Presse méd 35 1419 (Nov 19) 1927) reports neuritis with motor, sensory and trophic changes, *following the prophylactic administration of tetanus antitoxin*. Alfred Gordon (Med J and Rec 127 530 (May 16) 1928) observed 2 cases

with radial paralysis 24 hours after prophylactic inoculation against scarlet fever. Both cases recovered in 4 weeks.

Ledoux (Presse méd 37. 516 (Apr 20) 1929) reports a rare case of polyneuritis with Korsakoff's psychosis in a pregnant woman, aged 20. In the beginning of the pregnancy the patient had intractable vomiting with tachycardia and loss of weight, so that the question of interruption of the pregnancy arose. The vomiting, however, stopped in the third month, but the patient became apathetic and childish, developed an anterograde amnesia and became disoriented with regard to place and time. At the same time hyperalgesia, abolition of the tendon reflexes and atrophy were observed in the lower extremities. The Wassermann reaction and the examination of the cerebrospinal fluid were negative. Alcoholism was not reported. The pregnancy was not interrupted, and the patient recovered rapidly after the delivery of the fetus at term.

B. W. Mankowsky (Deutsche Ztschr f Nervenhe 109. 84 (July) 1929) discusses the occurrence of multiple neuritis following carbon monoxide poisoning, on the basis of the literature on the subject and his personal experience. The case records of 7 of his patients are given, each of whom, although presenting somewhat different symptoms, was believed to have a disturbance of the peripheral nerves and vessels together with hemorrhage. Certain mechanical and traumatic factors may explain the disturbance of the circulation of blood in the extremities or other parts and the resulting hemorrhage in individual cases. Mankowsky concludes that

multiple neuritis following carbon monoxide poisoning results from the compression of nerves by a hemorrhage, originating from the fragility of the vessels, and from the infiltration of the epineurium and the perineurium with blood, with the ensuing formation of scars and ischemia of the nerves. This may occur in any nerve trunk. In most cases a number of nerves are involved. The prognosis is favorable on the whole, **thermotherapy**, especially **diathermy**, in the region of the suspected hemorrhage is indicated. The comparatively rare occurrence of multiple neuritis may in reality be a failure to recognize mild forms. This is possible in cases with edema of the extremities or with thickening of muscles due to hemorrhage.

Joseph Uttal (J Nerv and Ment Dis (Nov.) 1928) reports a case of pronounced generalized *lead intoxication* with a polyneuritis traceable to prolonged use of snuff adulterated with lead. The patient improved rapidly after withdrawal of the lead.

**DIABETIC NEURITIS.**—H. L. Parker (Proc. Stat. Meet. Mayo Clin. (Aug. 29) 1928) makes some interesting observations on diabetic neuritis and its resemblance to tabes. He states that it has been suggested that the disease may be divided into the neuralgic or hyperesthetic form, the ataxic form, and the motor form. This classification is not very satisfactory, inasmuch as the motor form is rarely seen, and the hyperesthetic and ataxic forms merge into one another imperceptibly. At the onset, the disease may assume the hyperesthetic form with severe sharp burning pains in the extremities or trunk and intense sensitivity of the feet, so

that the patient can hardly stand the pressure of the bed clothes. Cramping of the calves and numbness of the feet are common at this stage. Later, the ataxic stage may develop with absence of patellar and Achilles' reflexes, an unsteady gait and even, in some cases, Argyll-Robertson pupils. The term *pseudotabes* given to some of these cases is a very apt one. In a given instance it might not be possible to determine whether a patient has or has not, besides diabetes, coincidental tabes dorsalis. Examination of the spinal fluid and blood may not be of sufficient help, inasmuch as in some cases of tabes these tests are negative, even with a progression of tabetic symptoms. Furthermore, it is not outside the bounds of possibility that a patient may have co-existing syphilis of the nervous system and diabetes. The differentiation must be made clinically. Actually, the patient with diabetic neuritis has much more pain and tenderness in the lower extremities than the tabetic patient. Deep pressure sense is lost in tabes dorsalis, whereas in diabetic neuritis the muscles of the lower extremities may be excruciatingly tender. Hyperesthesia of the soles of the feet is not a common symptom in tabes and in a given case this general hyperesthesia of the skin and soreness of the muscles will help to exclude the presence of tabes dorsalis with diabetes. It must be emphasized, however, that it is in diabetic neuritis that one finds the only exception to the rule that typical lightning pains are not found in any other disease than tabes dorsalis. As a rule, these sharp stabbing pains, localized to a small area and shifting from place to place, are absolutely diagnostic of tabes dorsalis;

they may occur, however, in typical form in cases of diabetic neuritis but, in the opinion of the author, in no other disease.

Diabetic neuritis seldom appears before the age of 40 years and assumes its typical character in patients who have not yet reached the age for arteriosclerosis. With advancing age and arteriosclerosis the disease is less pronounced and tends to be blended with the usual manifestations of arteriosclerosis of the nervous system. In certain patients it may be difficult to ascertain whether the symptoms of which they complain are purely neuritic in origin or are due to closure of the vessels of the extremities which is common in diabetes. An elderly patient may have, for weeks or months, continuous aching pains in the muscles of one or the other lower extremity which may be due either to diabetic neuritis or to faulty vascular supply and represent a prelude to diabetic gangrene.

Besides the peripheral form of diabetic neuritis, there is a form attacking 1 nerve, the sciatic, femoral, ulnar, or median nerves being involved. This is so rare, however, that it is quite possible that in the cases reported some other factors, such as trauma, may have been present. The cranial nerves are sometimes involved, especially those supplying the muscles of the eye, and recurrent ocular palsy has been known to occur, again suggesting the erroneous diagnosis of syphilis of the nervous system. As a residue of ocular palsy there may be unilateral or bilateral Argyll-Robertson pupils. Parker (*ibid*) has seen paralysis of the palate and pharynx in a diabetic patient due possibly to involvement of the vagus and

glossopharyngeal nerves. The *prognosis* in diabetic neuritis is relatively good provided the diabetes is kept under control. The more severe symptoms tend to improve in a period of weeks or months and then ultimately disappear.

**TRAUMATIC NEURITIS.**—Cases of brachial paralysis complicating dislocation of the shoulder naturally divide themselves into those due to the dislocation itself and those due to mishaps in connection with the efforts at reduction. The former, or "primary," variety is discussed by Henry Milch (*Am J of Surg* 5:66 (July) 1928), less than 50 such cases having been reported. He relates 2 cases, one of a woman, 62 years of age, who fell upon the outstretched and abducted left arm and sustained a subcoracoid dislocation, complicated by complete paralysis of the arm. Reduction was readily made a half-hour after the injury, and the ease with which it was made aroused suspicion as to the extent of the paralysis. This proved to be complete below the shoulder with no loss of sensation, though tingling was complained of. The external rotators of the arm were not affected and there was no Horner's syndrome. Reaction of degeneration in the paralyzed muscles developed but the paralysis had already subsided considerably 10 weeks after the injury. The ultimate outcome is not known. The second patient, a man of 27 years, also had complete flaccid paralysis of the arm and no loss of sensation. Reaction of degeneration developed but recovery was complete in 7 months. The almost total absence of sensory disturbances in extensive brachial plexus paralysis resulting from pressure by a hema-

toma from a gunshot wound in the supraclavicular region is discussed by J. C. Yaskin (*Arch Neurol and Psychiat* 23:836 (Apr) 1930).

J. M. Martinez (*Progresos de la clinica*, 36:759 (Nov) 1928) reports the occurrence of a lumbar trauma, as a reflex blow, when the end of a small beam, which the patient was carrying, hit the roof. He was given local treatment consisting of douches of warm air and massage. Next day he complained of paresis of the right leg, which was followed by atrophy, and later, an area of hypo-anesthesia developed. There was no permanent invalidism but a slight lameness persisted.

**RETROBULBAR NEURITIS.**—Steindorff (*Nervenarzt* (July 15) 1929) presents an excellent review of the subject of retrobulbar neuritis in relation to disease of the nasal passages. Rhinologists, ophthalmologists and neurologists have failed to come to any agreement as to the relative importance of nasal or sinus disease and multiple sclerosis in the causation of retrobulbar neuritis. Among 50,000 eye cases Heine found 46 cases of retrobulbar neuritis of which 16 were cases of multiple sclerosis and only 3 could be attributed to diseases of the sinuses and orbits. On the other hand, among 18,587 eye patients, von Giesz had 58 cases of optic nerve affections, mostly retrobulbar, attributed to the nasal affections. Elschning assumes a nasal origin for 208 cases of optic nerve disease, giving the surprisingly high percentage of 17. On the other hand, Langenbeck found that 77 per cent of his cases of retrobulbar neuritis were due to multiple sclerosis and 3.5 per cent to sinus disease. Among 500 cases of

sinus disease, Herzog found retrobulbar neuritis in 47. This complication was 7 or 8 times as frequent in acute sinus infections as in the chronic. The Vienna ophthalmologist, Meller, goes so far as to assume a rhinogenic origin even for those cases in which multiple sclerosis subsequently develops, claiming that the existence of the sinus disease creates a locus of reduced resistance in which the unknown virus of multiple sclerosis first locates. There is general agreement that enlargement of the blind spot and central scotoma are the chief signs of retrobulbar neuritis, while the eye grounds often appear entirely normal.

Onodi has shown that disease of the sphenoid and posterior ethmoid sinuses is most prone to affect the optic nerves. In some instances the frontal sinus forms the roof of the optic canal and may then become a factor, and sometimes the posterior ethmoid cell may be in contact with the optic canal of the opposite side. Herzog has shown that catarrhal sinus inflammation may cause retrobulbar neuritis and it is, therefore, not necessary to demonstrate pus in the sinuses to prove this etiology. While retrobulbar neuritis from sinus disease, and also from multiple sclerosis, is often unilateral, that due to chronic intoxications is practically always bilateral.

The same subject is discussed at length by A. Cairni and L. Pietrantonì (*Riv. oto-neuro-oft.* 5: 101 (Mar-Apr) 1928), who consider the sinuses an important factor in retrobulbar neuritis. By injecting India ink, these authors have demonstrated very numerous delicate venous anastomoses between the posterior wall of the

nasopharynx and the retrobulbar adipose tissue. They believe that infection passes from the nose to the optic nerve by way of these vessels and also through the narrow spaces of contiguous bony walls.

G. A. Weill (*Arch. Ophth.* 1: 307 (Mar) 1929) admits that, in rare instances, inflammation of the posterior sinuses may cause optic neuritis. He does not believe, however, that retrobulbar neuritis is produced in this manner, but that it is to be considered as being the first and often the only symptom of multiple sclerosis.

**PROGRESSIVE HYPERTROPHIC POLYNEURITIS** (of Dejerine and Scotus)—This rare disease is characterized pathologically by hypertrophy of the peripheral nerves, ganglia and spinal roots, with increase in interstitial tissue and proliferation of the cells of the sheaths of Schwann with concomitant demyelination of nerve fibers. There is also an associated degeneration of the posterior columns of the spinal cord. Clinically, the outstanding features of these cases are severe polyneuritis, both motor and sensory, with major involvement of the lower limbs. The nerve trunks are readily palpable and are excessively firm. R. S. DeBruyn and Ruby O. Stern (*Brain* 52: 84 (Apr) 1929) collected 12 cases with histologic verification and 14 which were doubtful. To these they add a case of their own with pathologic studies. W. Harris and W. D. Newcomb (*Brain* 52: 108 (Apr) 1929) report a case of hypertrophic polyneuritis with recurrent attacks and complete recovery between attacks. The last attack lasted 12 months, with pronounced muscular wasting and terminal attacks of choking, dyspnea

and, finally, paralysis of the diaphragm, due to involvement of the vagus and phrenic nerves. A von Mellin (Munchen med Wchnschr 76 493 (Mar 22) 1929) regards progressive hypertrophic neuritis as a special form of muscular atrophy.

**TREATMENT OF NEURITIS**  
—GENERAL PRINCIPLES—E J Meier (Schweiz med Wchnschr 58 362 (Apr 7) 1928) states that there is no true etiological therapy for neuritis except with such noxa as lead, arsenic, alcohol, etc., in which case the treatment consists in **avoidance of these noxæ** and as **rapid an elimination of the poisons from the organism as possible**. Nevertheless, purely **symptomatic treatment** often helps.

1 The optimal posture of the affected extremity, the limb should not be allowed to hang.

2 Constant anodal **galvanization** with a 2 to 8 milliamperere current, according to the size of the nerve. The treatment should be given 3 to 6 times weekly from 5 to 10 minutes.

3 **Warm, moist compresses** should be applied to the painful areas at a temperature of 42° C (108° F) for half an hour morning and evening.

4 **Fango packs** at about 45° to 60° C (113° to 140° F) should be applied for 1 hour 3 times weekly.

5 If these treatments are of no benefit, a perineural injection of **hypertonic salt solution** may be given.

6 A combination of 1, 2, and 3 is advisable and has shown satisfactory results. The patient must absolutely **avoid the use of alcohol and nicotine**.

**X-RAYS**—A study of the analgesia produced by irradiation in 8 cases of diabetic neuritis revealed, according to F A Ford (Minnesota Med 11 368 (June) 1928), only partial and

gradual relief in about half of the cases. Of 3 cases of residual pain following herpetic inflammation, temporary relief occurred in 1 and gradual improvement in another, but in the third, with the exception of a few days of freedom from pain after the second application, the treatment seemed rather to aggravate the symptoms. In 5 cases of *sciatic neuralgia* in most of whom the condition was associated with chronic infectious arthritis (only 1 case affording objective data on which a diagnosis of neuritis could be based), irradiation relieved the pain usually within from 12 to 24 hours.

More comprehensive data with regard to the effect of irradiation in different varieties of nerve and inflammatory lesions must be collected before an interpretation can be reached (from the clinical point of view) of the mechanism by which pain is alleviated. Because of the freedom of this method of treatment from injurious effects, the ease of its administration, and the gratifying results it yields in many dissimilar conditions, the use of the x-rays for securing analgesia is worthy of trial in all cases of severe pain. It is to be emphasized that the irradiation required for this purpose lies well within the limit of tissue tolerance, and that in this field, in which there is clearly no indication for intensive irradiation, the radiotherapist must prevent the development of radiodermatitis, the occurrence of which, even in the first-degree stage, has done so much to create prejudice on the part of the laity against the therapeutic use of the x-rays.

**OPERATIVE TREATMENT**—For *mild forms* of traumatic ulnar neuritis

at the elbow, H Platt (Surg Gynec Obst 47 822 (Dec) 1928) recommends immobilization of the elbow joint as this is often sufficient to bring about a cure. For *severe and persistent neuritis*, late ulnar palsy, incomplete lesions of the ulnar nerve at the elbow in which there is incongruity between the nerve and its bed, he advocates his operation of **anterior transposition of the ulnar nerve**. With the patient recumbent, the upper arm is placed vertically and the elbow and wrist are sharply flexed. An inverted "V" skin flap is then turned back by cutting above the elbow behind the line of the internal epicondyle, at the elbow over the midline of the groove, and below in the course of the nerve. The nerve is first freed above, and then below, in the groove, in the whole extent of the wound and is drawn forward over the epicondyle. A new bed is made for it by dividing the aponeuroses of the common flexor origin at the epicondyle. The nerve is placed in this gutter and the several layers are closed above it. After the operation, the elbow is slung in moderate flexion for 10 days and movement of the fingers is encouraged immediately. In over 100 cases the results were most gratifying.

**SECTION OF THE INTERNAL PUDENDAL NERVE**—P Wertheimer and L Michon (J de chir 31 497 (Apr) 1928) report success from section of the nerve on 1 side in a case of *vaginismus* which had resisted all other methods of treatment. This operation is also said to be effective for the relief of *perineal* and *urethral neuralgia*, *cystalgia*, *kraurosis vulvæ*, certain cases of *pruritus*, and for the *pain of carcinoma of the vulva and vagina*. In the case of the last named

affection, bilateral operation is necessary.

**SACRAL EPIDURAL INJECTIONS**—Norman Viner (Arch Neurol and Psychiat 20 336 (Aug) 1928) describes in detail the technic of this operation which is becoming more popular. He obtained good results in obstinate cases of *sciatica* and *arthritis of the ankles*, *lightning pain of tabes*, *pains of cancer of the rectum*, *coccygodynia*, *amputation stump neuralgias* and *traumatic neuritis of the legs*. Viner states that the most plausible explanation for the benefits obtained can be ascribed to the tension of the cauda equina produced by the injected fluid producing a condition analogous to nerve stretching.

**NEURITIS, OPTIC.** See OPTIC NERVE

**NEUROMA.**—Tumors containing nerve tissue have been found in almost every part of the body. The biceps muscle was the site of a plexiform neuroma in a case presented by G Carrossini (Arch ital di chirur 23 172, 1929), while involvement of the neck occurred in a patient reported by G W Crile and P B Ball (Surg Gynec Obst 48 449 (Apr) 1929). The ascending colon was invaded by a ganglioneuroma in an instance cited by H Poate and K Inglis (Brit J Surg 16 221 (Oct) 1928). True neuromata are frequently associated with the abdominal sympathetics, examples of which were recently presented by B Kwartin and J R Twiss (Am J Dis Child 34 61 (July) 1927) and D F Cappell (J Path and Bact 32 43 (Jan) 1929). C B Henle (Am J Roentgenol 20 414 (Nov) 1928) had 2 cases of neuroblastoma, one affecting the paraverte-



bral ganglia, the other involving the adrenal gland. Another case of nerve tumor in the suprarenal capsule was reported by M. R. Reid (Ann Surg 88 516 (Sept) 1928) who, in the same paper spoke of "carcinoid paraganglioma" of the appendix. These neuromata of the vermiform appendix have attracted some attention and were reviewed by H. Barth (Virchows Arch f path Anat 273 62, 1929). Mediastinal involvement was reported by Crile and Ball (*loc cit*). Tumors of peripheral nerves were discussed by I. Cohn (Arch Surg 17 117 (July) 1928), who added a case of median nerve tumor and also one of metastatic growth affecting the radial nerve. In a case of G. B. Hassin's (Arch Neurol and Psychiat 19 1087 (June) 1928), the patient had a neuroma of the cauda equina simulating sciatica.

Excepting for eighth nerve growths, cranial nerve tumors have been infrequently cited. Cohn (*loc cit*) presented an encapsulated neuroma of the spinal accessory while 2 cases of primary tumor of the trigeminal nerve were reported by F. Altmann (Beit z path Anat u z allg Path 80 361 (Aug 1) 1928). Acoustic nerve growths have received much attention. That this condition might be part of a general neurofibromatosis was emphasized by W. J. Gardner and C. H. Frazier (Arch Neurol and Psychiat 23 266 (Feb) 1930). H. A. Skinner (Brit J Surg 16 440 (Jan) 1929) studied the embryology of these neoplasms and concluded that they were of mesodermal rather than ectodermal origin, developing from neurilemma sheath cells. N. Moreau (Rev de laryng (June 30) 1927) endeavored to distinguish the acoustic

neurofibroma from typical angle tumor on the basis of greater vestibular signs in the former. J. Morelle (Arch Surg 18 1886 (Apr) 1929) reported a metastatic growth involving the cochlear portion of the nerve. W. Penfield (Surg Gynec Obst 45 178 (Aug) 1927) calls attention to the fact that the encapsulated tumors of nerve tissue make up the surgically important group of such growths. He divides them into 3 classes: neural, perineural and meningeal.

The possibility of facilitating diagnosis of central nervous system tumors by vital staining of the microglia was offered by Carria (Ann Fac de med y pharmac 1 136), who pointed out that the stroma of neoplasms of the brain and cord stained intensely and would manifest themselves even through the meninges.

**NEUROSES.** See TRAUMATIC NEUROSES, also PSYCHONEUROSES.

**NEUROSYPHILIS.** See SYPHILIS OF THE NERVOUS SYSTEM, also SYPHILIS, CONGENITAL.

**NEW-BORN, DISEASES OF THE. — HEMORRHAGE —** D. Munro (Surg, Gynec and Obst 47 622 (Nov) 1928) reviewed necropsy studies in 45 infants who had died of intracranial injury. He found that the most frequent lesions were meningeal and cortical hemorrhages, congestion and edema of the brain. A few had fractures of the skull. A group of 48 infants who had evidence of intracranial injury at birth were studied again in later years. Thirty appeared to be normal. Five were still too young to permit final decision. The remainder had some type of lesion, the most common being hy-

drocephalus with associated idiocy or epilepsy. Convulsions and spasticity were also frequently observed. For the immediate *treatment* of cerebral hemorrhage, Munro advocated lumbar puncture to reduce the intracranial pressure, the administration of parental blood when signs of hemorrhagic disease were present, and lastly, the immediate elevation of depressed fractures of the skull.

In the hope of finding an additional method of *diagnosis* of intracranial hemorrhage, M F Eades (New England J Med 201 151 (July 25) 1929) examined the eye grounds of 138 infants within 24 hours of their birth. Retinal hemorrhages did not occur in all cases of intracranial injury, but it was observed that this condition was chiefly caused by forceps delivery rather than prolonged labor, contracted pelvis or fetal asphyxia.

The relation of spinal fluid changes to intracranial hemorrhage was studied in 100 premature infants by J Glaser (Am J Dis Child 36 195 (Aug) 1928). Among those who had a diagnosis of cerebral hemorrhage proved by necropsy 73 per cent had blood in the spinal fluid but in another group of 42 who had no cranial lesion, blood was also found. It was impossible to determine how often bloody spinal fluid was the result of trauma. At necropsy several subpial hemorrhages were found and in such cases blood would not appear in the fluid obtained by lumbar tap. Xanthochromia was common and in 60 per cent of such instances the Van den Bergh reaction was indirect, indicating that the source of the pigment was not hemoglobin. When the reaction was direct, Glaser concluded

that there was strong evidence of hemorrhage although marked icterus may give the same reaction.

A post-mortem method of diagnosis of intracranial hemorrhage with roentgenograms has been employed by H Yagi (Jap J Obst and Gynec 12 223 (Sept) 1929). He injected the internal jugular vein with 60 to 100 c c (2 to 3½ ounces) of a mixture of lead tetraoxide, gelatin, chalk and water, which penetrated to the smallest blood-vessels. M H Roberts (Am J Dis Child 38 1196 (Dec) 1929) in his post-mortem study forced 30 c c (1 ounce) of metallic mercury into the right common carotid artery and secured excellent roentgenograms of the circulatory system. He also tried iodized oil but concluded that mercury gave more distinct outlines, although its weight caused it to gravitate to dependent portions.

The fate of infants who survived intracranial hemorrhage was followed by E Rydberg (Acta obst et gynec Scandinav 7 323, 1928). Half of a series of 37 children studied were apparently normal, one-third were imbeciles or idiots and the remainder had abnormalities which would reduce their working capacity.

**ICTERUS NEONATORUM** — The *etiology* of icterus neonatorum has not yet been definitely established. A Goldbloom and R Gottlieb (Am J Dis Child 38 57 (July) 1929) have given evidence which they believe proved that the pigment comes from the rapid destruction of red blood corpuscles as the infant adjusts its circulation from a polycythemia of 5 or 6 million at birth to a normal count a few weeks later. According to the Van den Bergh reaction

there was an increase of the bilirubin in the blood of all infants shortly after birth, but the skin became jaundiced only when the concentration reached a certain point. They demonstrated an increased fragility of the blood corpuscles of infants during the first week of life, but were unable to find evidence of hemolysins.

Other investigators have acknowledged the hematogenous origin of icterus neonatorum but have attributed the destruction of the red blood corpuscles to the action of hemolysins. J. M. Mitchell (*Am J Dis Child* 36:486 (Sept.) 1928) added blood serum of the mother to a suspension of her infant's cells and incubated the mixture for 90 minutes at 37° C. Hemolysis took place when the mother's serum was diluted 1:2 to 1:64. He was unable to discover an increased fragility of the red blood cells or any differences in blood grouping of the mother's and infant's blood.

On the other hand, Lereboullet (*Paris med* 2:384 (Nov. 3) 1928) affirmed that icterus of the new-born resulted from an increased output of bilirubin by the liver. Before birth, the infant excreted this additional bilirubin through the umbilical vein, and examination of the mother's blood revealed abnormal amounts of it. When the umbilical circulation is cut off at birth, the pigment accumulates in the infant's blood and jaundice results.

**ASPHYXIA NEONATORUM** — Y. Henderson (*J A M A* 90:583 (Feb. 25) 1928), having had beneficial results from the employment of an oxygen and carbon dioxide mixture in the resuscitation of adults, advised its use in the treatment of

asphyxia of the new-born. He stressed the importance of maintaining physiologic conditions by keeping the infant warm and quiet and supplying a proper amount of CO<sub>2</sub> to stimulate the respiratory center. Adapting this principle, P. J. Flagg (*J A M A* 91:788 (Sept. 15) 1928) constructed a "one man" apparatus which consisted of a gas tank filled with the mixture, a water manometer to measure the pressure and an intubation tube to be inserted into the trachea. If the tube could not be placed into the trachea, a pharyngeal insufflation device could be substituted.

More simple yet is the method described by A. Mathieu and A. Holman (*J A M A* 92:1917 (June 8) 1929). They inserted a soft rubber catheter into the infant's trachea, sucked out the mucus accumulated there and then gently blew through the catheter into the patient's lungs. Expired air contains a sufficient amount of oxygen and an increased carbon dioxide content which the investigators believed should stimulate respiration of the infant. They stress the importance of blowing very gently and of not distending the infant's lungs too much. A glass trap at the end of the catheter near the mouth of the operator catches his saliva and the mucus withdrawn from the infant's trachea.

R. A. Wilson (*Am J Obst and Gynec* 16:379 (Sept.) 1928) has had success in the treatment of asphyxia neonatorum with the use of 0.003 Gm. ( $\frac{1}{20}$  grain) alpha lobeline injected into the umbilical vein. Of a series of 35 infants, all responded well, usually with rapid deep breathing for about 15 minutes after which there was a gradual return to normal.

This drug has been found to be without value by others

**BIRTH INJURIES**—In a discussion of *brachial plexus injuries* at birth, G D. F. McFadden (J Bone and Joint Surg 10 661 (Oct) 1928) declared that dislocation of the head of the humerus was one result of such an injury. This was followed by contracture of the joint capsule and interference with growth of the head of the humerus. He claimed that the mechanism of injury to the brachial plexus was not the straight pull on the head of the infant as it emerged but a depression of the shoulders or rotation of the head, and in breech presentations, a twisting of the body while the head was still engaged. If the shoulders are delivered with difficulty he advocated the use of a finger under the axilla at the risk of breaking a clavicle rather than pulling on an arm or twisting the head.

Following the trauma of difficult deliveries or strenuous efforts at resuscitation, infants sometimes develop subcutaneous nodules of *fat necrosis*, according to L. DeVel and Z. A. Bolin (Am J Dis Child 37 112 (Jan) 1929) who reviewed 32 instances in the literature and added 1 of their own. These lesions were usually multiple and appeared on the cheeks, neck, back, shoulders, buttocks and thighs and varied in size from that of a pea to the palm of the hand. They were markedly indurated and the skin over them was wrinkled and tightly attached. Because of their induration, the terms *sclerema* or *sclerodermia* and many others have been employed to describe them. The nodules developed usually at the end of the first week of life and sometimes remained for several months.

They were not painful and healed spontaneously. Microscopically, they appeared to be areas of fat necrosis surrounded and infiltrated with giant cells.

**INFECTIONS OF THE NEW-BORN**—In a series of 50 infants with *pemphigus neonatorum*, F. G. Collins and H. Campbell (Lancet 1 227 (Feb 22) 1929) observed that the average time of onset was 6 to 10 days after birth. The majority of the lesions first appeared in the groin, about the umbilicus or on the legs. Blisters were characteristic of the mild forms, but in the severe types, there were extensive areas of desquamation with associated fever and toxemia. The mortality was 10 per cent. A *staphylococcus aureus* was isolated from the lesions of all but 1 patient. No definite source of infection could be discovered although midwives had delivered the majority of these infants and were suspected of carrying the disease. The writers believed that the infection can be avoided if aseptic precautions are observed at birth and the child's skin is subsequently kept clean and dry. When blisters appear, they recommend daily baths with an antiseptic solution such as *potassium permanganate*.

H. C. Cameron (Lancet 1 1184 (June 8) 1929) reported 5 instances of *trismus neonatorum* which he believed were caused by meningeal irritation due to sepsis other than tetanus. These patients all had symptoms of muscular spasm resembling that of tetanus except that the facial muscles were less involved. In the spinal fluids there was evidence of meningeal irritation or of infection. One of the patients had an

infected umbilicus, 1 had an ulcer of the palate and 2 had an infected exfoliative dermatitis. At necropsy in 1 infant hyperemia of the brain and cord was discovered.

**PREMATURITY.**—In a study of 102 premature infants, N. W. Clein (Am J Dis. Child 37 751 (Apr) 1929) observed that infratentorial hemorrhage occurred in 50 per cent of those on whom necropsy was performed, otitis media in 16.6 per cent, syphilis in 11.11, atelectasis in 8.3 and tuberculosis in 5.5. The most common symptom was cyanosis, which he found was continuous when due to atelectasis, intermittent when the result of infratentorial hemorrhage, sporadic in conditions easily recognized on examination and terminal in patients with severe infections. Frequently there were no symptoms associated with such pathologic lesions as cortical hemorrhage, moderate degrees of atelectasis, patent ductus arteriosus and foramen ovale. Infections occurred more often in the older and heavier infants while the more immature usually died within a few days of infratentorial hemorrhage or atelectasis.

The fate of 108 premature infants has been studied by T. Steinforth (Zentralbl f Gynak 52 1332 (May 26) 1928). Seven died within a month after discharge from the hospital and 5 more died before they were a year of age. Gastro-enteritis was responsible for these deaths. Two died in their second year and 3 in their third, all from pneumonia. One child died of meningitis at the age of 4 years. Little's disease developed in 1 at the age of 4 months. The majority of those who lived to the age of 6 months had reached a

normal weight and height. It was the writer's opinion that those premature infants who lived a year had as favorable a prognosis for health as normal children.

**NICOTINE.—PHYSIOLOGICAL ACTION.**—A. S. Ssalischtschef and J. A. Tschernogoroff (Ztschr f d ges exper Med 64 319 (Feb 18) 1929) studied the action of nicotine on the heart of rabbits by an electrocardiographic analysis. They found that (1) nicotine in 0.00005 Gm ( $\frac{1}{2000}$  grain) doses produces no changes in the electrocardiogram. (2) In 0.0001 Gm ( $\frac{1}{500}$  grain) doses it decreases the rapidity of the heart beat. (3) With 0.0005 Gm ( $\frac{1}{200}$  grain) doses this retardation is more marked and the nomotopic rhythm becomes heterotopic. (4) A degree of ether narcosis which in normal rabbits would have no effect on the cardiovascular function, results in previously nicotinized animals in pronounced disturbances in cardiac rhythm and in death. (5) The changes in the electrocardiogram produced by nicotine are due to its action in the ganglions of the sympathetic nervous system. (6) Previous atropinization does not prevent the action of nicotine on the heart. The authors, however, were unable to demonstrate a complete analogy between the acute nicotine intoxication produced experimentally in animals with the pure alkaloid and the subacute intoxication produced in man by the substances of tobacco smoke.

C. H. Thienes (Am J Hyg 9 500 (Mar) 1929) found by experimentation on white mice, that injections of nicotine had no apparent effect on growth, as judged by the weight-growth curves.

R. Nicolayson (Norsk mag f Laegevidensk 90 957 (Sept) 1929) states that nicotine bitartrate injected subcutaneously into rabbits in doses of from 1.25 to 3.33 mg ( $\frac{1}{50}$  to  $\frac{1}{20}$  grain) per kilo (2 $\frac{1}{2}$  pounds) or body weight, usually causes a slight, very transient hyperglycemia, and in doses of from 4.9 to 5.4 mg ( $\frac{1}{15}$  to  $\frac{1}{12}$  grain) per kilo (2 $\frac{1}{2}$  pounds) of body weight, produces a rise in blood sugar of from 40 to 95 mg ( $\frac{3}{8}$  to 1 $\frac{1}{2}$  grain) per 100 cc (3 $\frac{1}{2}$  ounces) without general symptoms. With further

increase in dosage, there is a constant rise in blood sugar, with general symptoms (pupillary contraction, tachycardia, muscular twitching, etc.), the symptoms being definite only on a dosage of about 15 mg ( $\frac{3}{4}$  grain) per kilo ( $2\frac{1}{2}$  pounds) of body weight.

A Winterstein and E Aronson (Sewicz med Wchnschr 59 550 (May 25) 1929) tested numerous brands of cigarettes and found that their nicotine content varies between 0.7 and 3 per cent. More nicotine is absorbed by inhalation than without inhalation. Short, thick, loose and dry cigarettes yield the largest percentage of nicotine. The authors assert that legal regulation will be necessary to protect the smoker. They propose that manufacturers be compelled to publish the nicotine content of their products. This would increase the consumption of cigarettes that contain comparatively small amounts of nicotine, and in turn would lead to the raising of tobacco with a low nicotine content.

**NOVASUROL**—Novasurol (*merbaphen*) is the double salt of sodium mercurichlorophenyl oxacetate with diethylbarbituric acid. It is claimed to be a powerful diuretic, absolutely free from irritant properties, and therefore suitable equally for intravenous and for intramuscular injection, especially in cases of morbus cordis associated with dropsy. P. Iazarus-Barlow (Lancet 1 127 (Jan 21) 1928) states that in cases of long-standing heart disease the dose of novasurol should be considerably reduced and that intravenous inoculation is more advisable than intramuscular. He found that it may have a very profound action on the healthy liver and kidneys of rabbits, since in chronic heart disease the liver and kidneys are affected to a greater or less degree, this fact may be of importance. In chronic heart disease the central portions of the lobules of the liver are most severely affected by the back pressure, and the experiments show this is the portion of the liver on which the drug exerts its greatest effect. In long-standing heart disease, therefore, it seems that the dose of novasurol should be much reduced. In such cases the kidneys also may become damaged, and the experiments suggest that if there is any nephritis or albuminuria,

the drug is contraindicated, or at least should be given only in very small doses.

**PHYSIOLOGICAL ACTION**—H. M. Keith and B. I. Johnstone (Arch Int Med 44 438 (Sept) 1929) studied the action of novasurol on the kidney of a dog. In this study 5 dogs were given merbaphen in amounts corresponding to doses used therapeutically in man at varying intervals for periods up to 5 months. When the fluid and chloride intake were carefully controlled, and a sufficient period was allowed between doses of the drug, a diuresis and an increase in the urine chlorides always occurred during the 24 hours following the injection of the drug. On the other hand, when they were not controlled, both diuresis and increase in chloride output were inconstant. There was no constant change in the blood chlorides. The specific gravity and phenolsulphthalein excretion remained normal. Albumin appeared irregularly, particularly after large doses repeated at short intervals. Casts also appeared after toxic doses. When the kidneys were examined histologically, there was evidence of early degeneration from 3 to 9 days after the final doses of the drug. Some chronic change was present. This could not be attributed to merbaphen and was considered spontaneous. The kidney of 1 dog dying 5 days after a single lethal dose showed widespread tubular necrosis similar to that observed in the kidney of the rabbit and that shown by various writers to be produced by toxic doses of other mercury compounds in common use.

## NURSING AND INFANT FEEDING.—BREAST FEEDING

—F. H. Richardson (J. A. M. A. 89 1487 (Oct 29) 1927) reported an increase in breast feeding in the state of New York, especially in the country districts. He concluded that the general practitioner had been more active in recommending breast feeding than the obstetrician or pediatrician of the larger communities. The success of the campaign for maternal nursing, he believed, depends on a closer co-operation be-

tween the various specialists, the general practitioner and the boards of health

A method of increasing the vitamin content of mother's milk was advocated by M. Wachtel (München med. Wchnschr. 76: 1513 (Sept. 6) 1929). He observed that irradiated yeast fed to cows increased the quantity of milk and the amount of vitamins B and D that it contained. With this milk, rickets was prevented in rats. The investigator advised **irradiated yeast** as a diet for **lactating mothers**.

The most advantageous time for the first breast feeding of a new-born baby was investigated by W. Reiprich (Deutsche med. Wchnschr. 55: 959 (June 7) 1929). He allowed 200 infants to nurse at the breast for the first time 12 to 24 hours after birth, and another group of 200 were not permitted to suckle until 24 to 36 hours old. It was observed that the latter group gained weight more rapidly.

The differences of digestion of breast milk and cow's milk by infants were studied by J. R. Gerstley, C. C. Wang, R. E. Boyden and A. A. Wood (Am. J. Dis. Child. 35: 580 (Apr.) 1928). Stools of breast-fed babies had a fairly constant content of volatile and titratable acids. Infants on cow's milk formulas had stools of greater weight and a total acidity somewhat in relation to the weight, although much more variable than in breast-milk stools.

F. Boldt, C. Brahm and G. Andresen (Arch. f. Kinderh. 87: 277 (June 21) 1929) studied the mineral metabolism of infants who were put on breast milk for 1 month, next on cow's milk feedings for 1 month, and

then, for the following month, again received breast milk. The mineral output increased during the month on cow's milk diet and returned to near its previous level when breast milk was begun again. (Breast milk contains a much smaller percentage of mineral matter than does cow's milk). According to the results, the supposition would be that there was an actual assimilation of mineral during the period of high intake.

The relative vitamin content of cow's milk and breast milk was studied in a series of animal experiments by I. G. Macy and J. Outhouse (Am. J. Dis. Child. 37: 379 (Feb.) 1929). Vitamin A was present in both but breast milk had only half as much vitamin B as cow's milk. The anti-rachitic factors were present in larger quantities in cow's milk than in the human but in both the amount was insufficient to prevent rickets in experimental animals. However, the authors call attention to the large margin of safety in regard to the vitamins since, in spite of the apparent deficiency of vitamins A and B in the milk of the 2 mothers examined, their nursing infants grew and developed normally except that clinical signs of rickets appeared in the fourth and fifth months. They asserted that in the diets of the pregnant woman contain enough vitamins, and the "vitamin carrying" foods are offered the infant at the proper time, the growth of the child will be normal.

B. R. Hoobler (J. A. M. A. 91: 307 (Aug. 4) 1928) compared the clinical manifestations of *vitamin B deficiency* diseases, beriberi, as seen in Japan and in the Philippine Islands, with similar but milder symptoms

occurring among infants in this country. The most frequent of these symptoms were (1) anorexia, (2) loss in weight, (3) spasticity of the arms and legs, (4) rigidity of the neck and (5) restlessness. He believed that a partial deficiency of vitamin B in the diets of some infants was responsible for such an illness. The administration of  $\frac{1}{2}$  teaspoonful of brewer's yeast which contains a large amount of vitamin B gave relief to 1 infant with this group of symptoms.

A. P. Bloxson (Am J Dis Child 37 1161 (June) 1929) gave brewer's yeast to 4 premature infants and to 30 normal babies. They suffered no ill effects and their average daily gain in weight was much greater than that of a control group.

R. H. Dennett (J A M A 92 769 (Mar 9) 1929) studied the effects of vitamin B, both as a prophylactic agent and a treatment for symptoms such as loss of appetite, listlessness and failure to gain weight which he suspected were the results of a *vitamin B deficiency*. A series of 129 infants were given 1 tablespoonful daily of a dextrin and maltose sugar made from the germ of wheat which is rich in vitamin B. The treatment was started at the age of 2 months and continued until the patients were 9 months old. Their general nutrition and health were good and they were free from the symptoms mentioned above. A second group of 21 infants who had developed the typical manifestations of vitamin B deficiency were given the mixture and there resulted an improvement in health, a slow disappearance in the symptoms over a period of 2 weeks

with an increase in appetite and gain in weight.

**CERTIFIED MILK** — Certified milk as an infant food, was superior to milk collected under ordinary conditions and pasteurized, according to M. S. Lewis (Arch Pediat 46 85 (Feb) 1929). He compared the average weight, growth, development, incidence of rickets and of infections, and the mortality of 2 groups of infants, 1 of which received certified milk and the other pasteurized milk. A total of 122 patients received certified milk formulas and 112 were given pasteurized milk. The former group gained weight more rapidly during the first 3 months and later the 2 groups gained at about the same average rate. Rickets occurred less frequently and less severely among those on certified milk diets, and the same infants had less diarrhea and a lower mortality rate than the others. Lewis recommended breast feeding when possible, but if a substitute milk was necessary, he believed that certified milk had many advantages over pasteurized milk.

**EVAPORATED MILK** — The relative merits of pasteurized milk, boiled milk and unsweetened evaporated milk for infant feedings were reported by McK. Marriott and L. Schoenthal (Arch Pediat 46 135 (Mar) 1929). Evaporated milk formulas were given to 752 patients including 11 premature infants, 570 new-born infants, and 75 sick infants. A control group of 670 were fed other forms of milk mixtures. The average gain in weight of the well infants was as great in the one group as in the other. The sick infants fed with evaporated milk gained more weight than the corresponding num-



ber on other diets and the premature babies tolerated the evaporated milk well and gained weight. The writers conclude that the sterility, the uniformity of composition and the ready digestibility are advantages which make evaporated milk suitable for infant feeding.

J Brennemann (J A M A 92 364 (Feb 2) 1929) employed evaporated cow's milk as a diet for a group of children suffering from acute illnesses largely of a respiratory nature. He added acid to the formulas of some and withheld it in others. There seemed to be no appreciable difference in the results. Of a group of 67 patients who received acidified evaporated milk formulas, 62.7 per cent gained weight or remained the same. Of 61 infants who were given non-acid milk, 62.3 per cent gained or remained stationary. All the infants tolerated the mixtures well and had soft, well digested stools. Brennemann suggested that probably milk was more easily digested when the size of the curds formed in the stomach was smaller, and that the addition of acids or alkalies, and the evaporation of milk, each caused a similar reduction in the size of the gastric curd.

Z Wallen-Lawrence and F C Koch (Am J Dis Child 39 18 (Jan) 1930) investigated the action of trypsin on raw cow's milk and on cow's milk which had been pasteurized, boiled or evaporated. The milk was kept alkaline during the experiments to prevent precipitation of curds which might influence the digestive action. They observed that pasteurized, boiled or evaporated milks were more readily digested by trypsin *in vitro* than was raw milk. The

action of the trypsin did not appear to be affected by the casein in the milk, nor by the buffer content but was probably dependent on some heat-labile substances in the whey, possibly in the albumin portion. The influence of peptic digestion products on the action of trypsin must be studied, the writers claimed, before the inhibitory and accelerator factors can be determined.

In the Philippine Islands, the methods of collecting and storing cow's milk have been unsanitary and for many years, **powdered whole milks** have constituted the basis of the diets of artificially-fed infants. J R Perez (J Philippine Islands M A 9 265 (Aug) 1929) has tried fresh milk and canned milks of many varieties but has observed that over a period of years the powdered whole cow's milk has been the most satisfactory product because of the sterility, the simplicity of its preparation for use and the small expense.

The superiority of powdered whole milk over fresh milk in infants' diets was observed by L O Ashton, O L Stringfield and C W Martin (Arch Pediat 46 75 (Feb) 1929). They reported an average gain of 6.34 ounces (203 Gm) a week by babies who received the powdered milk since birth. Infants with digestive disturbances tolerated evaporated milk feedings well. The stools were usually softer than those of patients on boiled milk formulas, and the fat digestion was better. Diarrhea occurred in a few infants, accompanied in two instances by respiratory infections. Evaporated powdered milk modifications were recommended as safe and effective for infant diets.

**MODIFIED MILK MIXTURES.**

—The results of the use of citric acid milk in the diets of 150 infants were reported by J. E. Gonce, Jr., and H. L. Templeton (*Am J Dis Child* 39 265 (Feb) 1930). The milk was prepared by the addition of 4 Gm (1 dram) of dehydrated citric acid to a quart (liter) of milk that had been boiled for 5 minutes and subsequently cooled. There was no need to chill the milk or to add the acid slowly with stirring as is the case with lactic acid milk preparation. They believed this was one advantage of the citric acid milk. They also claimed that the latter milk was more palatable than lactic acid milk. Several of their series of infants who had been vomiting lactic acid milk, took citric acid milk mixtures readily. At the height of digestion of this milk, the gastric contents were examined. The casein curds were small and there was a hydrogen ion concentration ranging from 3.72 in the sick infants to 4.15 in the normal ones. The stools were smooth and of normal consistency, except in a few instances when the writers believed that too high percentages of carbohydrate were given.

Observation of the clinical course of 11 debilitated infants, some of whom had received feedings of cultured buttermilk and others an artificially prepared lactic acid milk, led A. B. Marfan and M. Chevalley (*Nourrisson* 16 257 (Sept) 1928) to conclude that the buttermilk was the superior food. The milk was more easily digested, they believed, because of the fermentative changes of the casein rather than the acid content. They have frequently considered it advisable to reduce the

acidity with lime water. Five of the group of 11 under observation developed symptoms of vomiting, diarrhea or dermatitis of the buttocks, and all of these were receiving the lactic acid mixtures while those on the buttermilk feedings were free from these disorders.

M. Gleich (*M J and Rec* 130 153 (Aug 7) 1929) has found lactic acid feedings for premature infants beneficial when breast milk cannot be obtained. Mixtures prepared so that 1 teaspoonful of lactic acid and 4 tablespoonfuls of karo syrup were added to a quart (liter) of boiled sweet milk, were given to babies in feedings of  $\frac{1}{2}$  ounce (15 cc) every 2 hours. For the first 10 feedings skimmed lactic milk was given but by the end of the first week, the diet usually consisted entirely of whole lactic milk. Gleich had tried condensed milks and many of the proprietary infants' foods for similar types of patients but obtained the most favorable results with lactic acid milk formulas.

Knoepfelmacher's modified butter meal was fed by G. Jungwirth (*Monatschr f Kinderh* 38 500, 1928) to a series of 55 infants suffering from digestive or nutritional disturbances or from infections. Good results were obtained in 40 instances. The butter meal has a very high caloric value, 260 calories per 100 Gm ( $3\frac{1}{3}$  ounces). It is prepared by mixing together 130 Gm ( $4\frac{1}{2}$  ounces) of milk, 10 Gm ( $2\frac{1}{2}$  drams) of flour, 10 Gm ( $2\frac{1}{2}$  drams) of butter and 15 Gm ( $\frac{1}{2}$  ounce) of sugar, and evaporating the solution to the volume of 100 Gm ( $3\frac{1}{3}$  ounces). He claimed that this feeding was not well tolerated by children under 2 to 3 months

of age or by those who have difficulty swallowing or have evidence of intoxication Jungwirth believed that it was especially adapted for older infants convalescent from a recent illness or for undernourished babies

F. Thoenes (Jahrb f. Kinderh 120: 1 (May) 1928) performed metabolism tests on 7 infants who were 1 to 5 months of age and who had received high fat diets The energy quotient was no higher as a result of these feedings than among infants to whom food poor in fat had been given The retention of calcium and phosphorus was less in the infants who received large amounts of fat

L Moll (Munchen med Wchnschr 76 878 (May 24) 1929) observed that digestive disturbances in some infants were improved by the dilution of the milk formula and the addition of starch or other carbohydrate to increase the caloric value Instead of the use of raw flour which forms a thick paste in milk, he advocated the addition of a powdered cake made of wheat and malt flour and salts such as chlorides, carbonates and phosphates While this mixture is being cooked, sugar and milk may be put with it in the proper proportions The resulting gruel has been useful as a complementary feeding for infants on the breast or in diarrheal diseases Moll recommended that it replace other feedings entirely

To determine the role that carbohydrates play in producing *diarrhea*, L H Barenberg and H Abramson (Arch Pediat 47 1, 1930) fed infants milk formulas containing as high as 15 per cent sugar Such diets were given to 10 patients admitted to the hospital during the months of May to

September A few had mild attacks of diarrhea which soon disappeared. Six infants admitted during January to June received similar feedings. Four had grippe and an associated diarrhea probably not due to the high carbohydrate diets No sugar was present in the urines and no excess carbohydrate was detected in the stools The infants added weight more rapidly than those on regular diets

W Stoeltzner (Deutsche med Wchnschr 56:4 (Jan 3) 1930) advocated the addition of eggs to the diets of young infants He asserted that if the eggs are hard boiled, the toxic effects usually can be eliminated and their properties of preventing rickets and anemia make them a valuable food for weak and for premature babies He has prepared an egg-soup feeding which contains 10 Gm. (2½ drams) of corn flour in ½ liter (1 pint) of water, ½ liter (1 pint) of milk and 60 Gm (2 ounces) of cane sugar This mixture was boiled and added to a beaten egg and strained He has given this diet to premature and debilitated infants when breast milk could not be obtained No ultra-violet irradiation or viosterol was given these patients and yet they did not develop rickets and their hemoglobin and their erythrocyte counts remained normal

**MILK-FREE DIETS.**—Some infants who have eczema or other conditions suggesting an idiosyncrasy to food protein may require milk-free diets for long periods of time Several years ago a modified milk was developed in which the casein of milk was replaced by almond milk. Several investigators have reported favorable results with this milk.

Other foods of a similar nature have been suggested since G Abraham (Arch. f Kinderh 84 36 (Apr 27) 1928), fed infants with **zweiback** or **meat puddings** as a substitute for milk. The stools of these patients contained but a few colon bacilli and many Gram-positive micro-organisms. The nutrition of the infants compared favorably with that of infants receiving milk.

Within the last year, L W Hill and H C. Stuart (J A M A 93 985 (Sept 28) 1929) made a synthetic infant food with **soy bean flour** as the base. To this flour was added **barley flour, olive oil, sodium chloride** and **calcium carbonate** in such proportions that the dilution of 6 tablespoonfuls of the powder with 7 ounces (210 c c) of water resulted in a mixture containing 2.81 per cent fat, 4.15 per cent protein, 4.07 per cent carbohydrate and 1.06 per cent salts. The pH is 7.2. There are 17 calories to the ounce (30 c c) but carbohydrate may be added in quantities desired to raise the caloric value. This preparation is now being manufactured under the trade name "**Sobee**". Forty infants were given this food and it was well taken. The stools occasionally were more numerous than normal but no instance of diarrhea occurred. Several patients who had persistent attacks of eczema improved remarkably, the writers declare. Although they were not prepared to state that this preparation is as good a food as milk, they believed it had a place as a substitute when milk could not be tolerated.

**NYSTAGMUS.—NEUROLOGICAL ASPECTS**—S Baumeol (Ohio State M J 24 283 (Apr) 1928) out-

lines the neurological aspects of nystagmus. He says that the normal function of the vestibulo-ocular reflex is to assure and regulate the tonic innervation of the conjugate eye muscles and that any disturbance in the vestibular apparatus causes an upset of this equilibrium and produces nystagmus.

**VESTIBULAR**—S S Quittner (Ohio State M J 24 278 (Apr) 1928) discusses the more practical phases of otological nystagmus and states that there are 3 degrees of labyrinthine nystagmus which may be caused by disturbance in the peripheral organ of the vestibular nerve, by disturbance of its central organ or ramifications, or by disturbance of the eighth nerve, or which may be induced by experimental methods.

When a labyrinth has been destroyed, compensations or adjustment may occur and may be studied by means of the turning test.

A C Ivy (Arch Otolaryng 9 123 (Feb) 1929) explains that as a result of stimulation of the non-acoustic labyrinth, compensatory movements of the eyes occur. These consist in a slow movement called "deviation" and a quick movement in the opposite direction called "nystagmus". The deviation of the eyes is due entirely to stimulation of the labyrinth. The nystagmus is probably due to a reflex occurring by way of the muscle centers of the eyes and initiated by the stimulation of kinesthetic sensory nerve endings in the muscles of the eyes. The cerebrum maintains an inhibitory control of the reflex.

**CALORIC**—A de Kleyn and C. Versteegh (Paris méd 18 30 (Nov 3) 1928), in discussing the functional

examination of the ear make the following observations

1 In mammals, caloric reaction probably arises in the semicircular canals. This opinion is based on the facts that the direction of caloric nystagmus depends on the position of the horizontal semicircular canal and that normal caloric nystagmus results in a guinea-pig even though the otolithic membrane is removed, also after extirpation of the macula of the saccule

2 The clinical methods for investigation of caloric labyrinthine reactions by means of cold water alone and only in one position of the head, may lead to erroneous interpretation of responses

According to R Lorente de No (Paris méd 18 30 (Nov 3) 1928), study of pathological brain sections shows that labyrinthine nystagmus

results even though vestibular cerebral association tracts are destroyed

**SPONTANEOUS.**—In order to differentiate between labyrinthine and non-labyrinthine nystagmus, H Brunner (Arch Otolaryng 9 1 (Jan) 1929) utilizes the following points. Labyrinthine nystagmus is always accompanied by labyrinthine dizziness, turning dizziness, tactile dizziness. Spontaneous labyrinthine nystagmus always exhibits associated eye movements, which in its typical form, is combined horizontal and rotatory, or only rotatory. Diagonal spontaneous nystagmus is practically always of non-labyrinthine origin and vertical spontaneous nystagmus is often of the same origin. He stresses the importance of inversion of experimental optical nystagmus as elicited by means of his revolving umbrella

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**OBESITY.—ETIOLOGY.**—With increasing prosperity due to high wages, increased leisure due to shorter working hours, and increased supply of cheap fresh vegetables containing assimilative stimulatory vitamins due to advance in refrigerative transportation, an increasing percentage of the population is becoming obese, particularly among the females, as a result of the overgratification of the nutrition instinct. Literally we are living on the fat of the land and waxing fat thereby. Not all cases of obesity, of course, are due to abnormal ingestion of food. Many are based on an inherent distortion of metabolism to the end that the anabolic phase markedly predominates

The cause of the distortion is usually endocrine in nature, and by and large in females attributable to ovarian dysfunction. Exceptional are cases deriving primarily from thyroid and more exceptional those from pituitary hypoactivity. Then there are constitutionally conditioned disorders which may be inherited, are frequently familial, and sometimes arise from congenital causes

In any given patient one or more, or all, of the endocrines noted may be participants in the anabolic stimulation, or rather perhaps the catabolic depression. About 30 per cent of all women gain considerably in weight upon decrease or abolition of the ovarian function. Since all do not do

this, it is apparent that there is present in those who become obese a constitutional factor which is liberated by the endocrine dysfunction. A myxedematous person is fat when she is fat because she eats more than her 30 to 40 per cent lowered basal metabolism can dispose of, save by storage. *Myxedema* affects only the capacity for burning calories. *Hypopituitarism*, on the other hand, resulting as it usually does in increased sugar tolerance, provides a basis for obesity in facilitating utilization, in addition to the lowered basal metabolism. At present writing it is logical to suppose that thyroid or pituitary treatment for the obese is best indicated when a low basal metabolism is present, while dietary restriction alone is indicated when a normal basal rate is present.

**PATHOLOGY**—Turning now to some of the characteristics of the obese, S A Holboll (Klin Wchnschr 8 503 (Mar 12) 1929) reports that in spite of the fact that, in proportion to the weight, the patient with adipositas has a smaller amount of blood than the normal person, the total amount of blood is larger. The size of the heart, however, does not increase in the same proportion as the quantity of blood. This may be the basis of the cardiac insufficiency frequently present in the obese. W Scharpff (Deutsches Arch f klin Med 165 1, 1929) records the study by x-ray of heart size before and after reducing treatment. Excepting the patients with small hearts at the beginning, a decrease in the heart size generally followed the loss of 15 pounds body weight when the cardiovascular system was normal. When the myocardium was normal but

blood-pressure high, the lowered blood-pressure was of greater moment than loss of weight in reducing heart size. When blood-pressure was normal but myocardium impaired no change in heart size followed body weight reduction. When blood-pressure was high and heart impaired it decreased in size with decrease in body weight. The change in heart size is attributed, not to decrease in myocardium or heart fat, but to decrease in systolic residue with a resulting disappearance of the compensatory dilatation. Marked dilatation is as rare in the young obese as it is frequent in the adult.

**TREATMENT**—In the obese, reducing treatment is indicated primarily for increasing cardiac functional capacity. A M Master and E T Oppenheimer (J A M A 92 1652 (May 18) 1929) summarize the circulatory status of the obese as follows: dizziness, dyspnea, fatigue, palpitation, and headache are usually complained of. When loss of weight is induced by dietary restriction these symptoms pass. Sixty-seven per cent of cases show hypertension, and rapid pulse is usually present. With loss of weight, both decrease. The blood-pressure of obese persons increases with advancing years, and with duration of the obesity. The exercise tolerance of persons over 30 years is less than normal. It increases with loss of weight. Under 30 the ability of the obese is a bit better than the normal. This implies that moderate overweight in the young is a slight advantage. X-rays show a sthenic, or hyper-sthenic habitus, elevation of the diaphragm, and an enlarged, widened heart, with hypertrophied left ventricle, and a hazy lower left

border, obscured by apical pericardial fat. These characteristic signs disappear with reduction in weight. The electrocardiograms show in obesity a sinus arrhythmia, left ventricular preponderance, and inversion of the P and T waves in lead III. It is not difficult to understand why a fat person is a poor surgical risk, and why the mortality in pneumonia, nephritis, and heart disease is higher than the average. The facts also explain the distinct improvement usually observed on weight reduction in patients with valvular disease of the heart, hypertension, and coronary heart disease.

In *non-myogenous* obesity treatment by dietary restriction solely is obviously indicated in view of the probability of a damaged heart being present. In *pituitary adiposity* commercial preparations have given no good results. That this should be so is clear from the works of Evans and his associates which show how unstable is anterior lobe substance in action, unless given fresh or prepared as fresh extract with the utmost precautions. Desiccated preparations are usually worthless. Outside then of dystrophia adiposogenitalis, reducing treatment boils down to 2 basic principles: either increase catabolism or reduce anabolism. Increasing catabolism by thyroid administration and, or, exercise, unless most carefully supervised, is a hazardous thing, to say the least. The safest way, though the longest, is to decrease anabolism by dietary restriction. But here comes the difficulty of a lack of sufficient will power to refrain from the accustomed *luxus* consumption of delightful food. Hence a combination attack on the obese from both points

of view is frequently necessary. It is possible to speed up catabolism somewhat by giving foods which have a high specific dynamic activity. That is to say, push the proteins: provided, of course, there are no contraindications.

F. A. Strang and J. M. Evans (J Clin Investigation 6: 277 (Oct.) 1928) cut the calories down to 6 to 8 per kilo ( $2\frac{1}{2}$  pounds), but give more than enough to keep the patient in nitrogen equilibrium—1 Gm. (15 grains) per kilo ( $2\frac{1}{2}$  pounds) body weight. As for fat and carbohydrate allocation, they are distributed in such proportion that the ketogenic-antiketogenic ratio is 1.5 to 1. In other words, the diet must be planned on metabolic principles. When this is done a sense of well-being obtains even on diets as low as 600 calories per diem. *Endocrine obesity* yields to such treatment. Most of the menstrual disorders are corrected.

In concluding, note should be made of a condition described by T. Christiansen (Hospitalstid 71: 421 (Apr. 26) 1928) as *macrosomia adiposa congenita*. It is an obese type of premature development probably depending on hyperfunction of the suprarenal cortex. It is in a class by itself because of the absence of sexual abnormalities and hirsuties. It may be regarded as a lethal hereditary abnormality.

**OLD AGE.**—The subject of old age has received very special treatment in a monograph by A. S. Warthin (P. B. Hoeber, New York, 1929). Old age is not a disease, but a normal state brought about by involution processes which occur in organisms just as all sorts of other proc-

esses occur. The inevitable end of all living individuals not removed early by accident or disease is old age and death. Old age is relative, however, both from individual to individual and in parts of any one individual. The placenta is aged at birth, the thymus is aged and undergoes involution before the rest of the body, the ovaries, etc. Warthin divides these latter minor, from the major involution of all the vital organs and function. The former he says are for the good of the individual, the latter for the good of the species since when the individual has fulfilled his species function, that of reproduction, he is then useless.

He has no good to say of the attempts at rejuvenation, whether by glandular therapy, ligation of the vas deferens or other exploited methods. Old age must be accepted as an inevitable price of living from which there is no escape. But it can be met fairly and squarely and with courage. Since the mental powers are preserved longer than others in senescence, they can be turned to good account with the experiences of life to guide them into sound intellectual and philosophical creations.

Comments might be made upon his views in some such fashion. The energy charge set in action at the moment of fertilization, he says, gradually becomes weakened and must be renewed from generation to generation. If then, as he says, old age is not a disease but a running down of the clock, surely no one would say it was impossible to rewind it, even though extremely improbable to us now. The revelations of modern physics following the first and second laws of thermo-dynamics

give no end of promises for the future. The acid-base equilibrium of the body is fairly well studied, a new equilibrium, that controlling cell division, one with sulphur as the central figure, is just discovered, and awaits solution. How many other equilibria are there? Who is rash enough to say that these chemical equilibria cannot be controlled? Do not old people start growth again when they heal wounds?

To take the bull by the horns, the reviewer thoroughly disagrees with this thesis of old age and with resignation to fate. Is not resignation to the *seemingly* inevitable the characteristic of all philosophies (except that of Nietzsche which says to fight) and religion generally? Is not resignation a symptom of old age? Can we forget the beating chick heart of Carrel, which freed from its accumulating metabolites is living on and on, now for 16 years? Can we escape the facts so abundantly proved by experiments that the machine does not run down, but only gets clogged by accumulated débris? Old age is not a "normal" phenomenon, nor an inevitable result. If it gives any comfort, we can console ourselves with the thought that each of us as individuals has been on earth for millions of years and will continue to be for millions of years. The first law of matter states that matter can neither be created nor destroyed. Only, perhaps, we will be here as energy at some time or other, if Einstein is correct. At any rate, we will be here, even if changed, but who will say that humans will not control change?

But even granting the inevitability of senescence, it does not mean that



old people should not be given the benefit of treatment when they develop conditions common to all ages or those peculiar to old age. That this is well recognized is manifested by a number of contributions on the treatment of various infirmities in the aged. For instance since the basal metabolic rate is sometimes diminished in old age, **thyroid extract** is recommended in small doses. In the matter of surgical conditions, the mere fact that an individual is old in years is no contraindication to the repair of hernias, varicose veins, etc., nor to operative relief of gall-bladder disease, hemorrhoids, infections, etc. Modern functional tests used pre-operatively have done much to minimize the operative risks.

**OLIVE OIL.**—D. Moggi (Riv di clin pediat 26 204 (Mar 25) 1928) found a mixture of olive oil and flour, in general, well tolerated by infants even during the first months of life. It agrees particularly well with **atrophic infants**, who show a greater tolerance for it than for the ordinary milk-flour mixture. Children fed this mixture withstand the minor parenteral infections more easily, and with less damage to the intestine and to the state of nutrition. In **tuberculosis** it gives good results. Not only the state of nutrition, but also the general appearance is much better in infants fed this mixture, than in others who receive the common food mixtures. The food does not have an excessive laxative action, or, at least, his experimental subjects always presented normal stools.

**OPHTHALMIA, SYMPATHETIC.—TREATMENT.**—E. B. Heckel (Arch Ophth 57 54 (Jan) 1928) describes his method of treatment in 4 cases of sympathetic ophthalmia. The result was favorable in each case. In the first case 5 doses of **diphtheria antitoxin**, each of

3000 units, were given. In the second case, after an initial dose of 1500 units, 4 doses of 3000 units were injected at intervals of a week. Only slight improvement occurred, so the dose was increased to 20,000 units, which was repeated daily for 4 days, when very considerable improvement ensued. The third case was a child, aged 6 years, 5000 units were given daily for 10 days with very good result. The fourth patient was given 20,000 units daily for 7 days, with the result that the sympathizing eye regained full vision, after being reduced to 2/200. He emphasizes the need for large doses of antitoxin.

**OPIUM.—PHYSIOLOGICAL ACTION.**—O. H. Plant and G. H. Miller (J Pharmacol and Exper Therap 32 437 (Apr) 1928) summarize the results of their studies on the effects of the opium alkaloids on the muscular activities of the various portions of the alimentary canal in unanesthetized animals as follows: (a) In the stomach the effect is a marked fall in muscular tone and relaxation of the lower fundus and pyloric antrum, with disappearance of peristaltic activity. This occurred in both dog and cat. (b) In the small intestine (ileum) there is increase in muscular tone, and increase in the frequency and amplitude of the peristaltic waves. Changes of the same type were obtained in man. (c) In the colon the pronounced effect is a marked increase in tone, accompanied by more continuous peristaltic activity, although the rate and amplitude (depth) of peristaltic waves are not materially altered. The same effects were obtained in man. The application of these results to an explanation of the constipating action of opium seems to be as follows: Relaxation of the stomach wall and decrease in peristalsis of the pyloric antrum decreases the rate of discharge of gastric contents into the duodenum.

**OPSONINS.**—The whole question of the mechanism of the action of the

opsonins is bound up naturally with the whole question of immune bodies in general. Fortunately, many investigators are attempting to explain in straightforward physico-chemical terms some of the words which hamper the subject. S. Mudd, B. Lucké, M. McCutcheon and M. Strumia (*Am J M Sc.* 176 897 (Dec.) 1928) are studying the physics of these reactions.

Preparing immune sera by injecting rabbits with B. tuberculosis and others, they studied the effect of precipitation, agglutination and later centrifugalization. Then the bacteria were observed in an oil-water interface, after treatment with immune serum they resisted passing into the oil. The electrokinetic differences between bacteria and media were then studied. Finally, the degree of phagocytosis was determined in treated and untreated mixtures. The results all point to an explanation of these various reactions in terms of the surfaces of the various aggregates. That is to say, the immune serum was combined with and deposited upon the bacterial surfaces. There can be no doubt that surface reactions play an important part in this as in so many other fields.

#### OPTIC NERVE — ATROPHY.

—J. Duport (*Thèses de Lyon*, No 37, 1927-1928) records a case of unilateral optic atrophy in a woman aged 70, and has collected from the literature 8 similar cases of ophthalmic herpes zoster followed by optic atrophy and complete blindness. He favors the theory of an intracranial meningitis with a secondary optic meningitis and neuritis. Of 9 cases, 7 were unilateral and only 2 bilateral.

C. Berens, H. T. Smith and L. H. Cornwall (*Arch Neurol and Psychiat* 20 1151 (Dec.) 1928) report that papilledema is frequently a late, rather than an early, sign of increased intracranial pressure, and may be absent in the presence of hypertension of long standing. From clinical, pathologic, and experimental studies of the pathogenesis of papilledema, the most important factors in its production appear to be mechanical blocking of the lymphatic drainage by pressure of the cerebrospinal fluid on the optic nerve and the lymphatic channels which surround the central artery of the retina. Mechanical obstruction to venous outflow is possibly a less important factor in the production of hemorrhages and exudates.

When papilledema is established, the observations on the retinal blood-pressure may be misleading by indicating a low intracranial pressure in certain cases when the intracranial pressure is actually high. No explanation is given for this. Bailliart's method for determining the diastolic and systolic blood-pressure in the central artery of the retina is valuable to the trained observer in spite of inaccuracies. The authors' observations in a series of 11 subjects who were examined in the sitting position by Bailliart's method, showed an average blood-pressure in the brachial arteries of 118 systolic and 76 diastolic, the intraocular pressure averaged 17 in the right eye and 17.5 left eye, the retinal blood-pressure in the central artery averaged 68.2 systolic, 32.2 diastolic right eye, and 67.4 systolic, 32 diastolic left eye. These figures are lower than those obtained by others using the same method.

A marked increase in retinal diastolic pressure was noted when the subjects changed from standing to the prone position. Jugular compression caused a marked increase in cerebrospinal fluid pressure, which was accompanied by a marked rise in diastolic pressure in retinal arteries in 4 patients. When a diagnosis of increased intracranial pressure has been made, the method is an aid to observations on augmentation and remission of pressure.

F. R. Ferguson and M. Critchley (J. Neurol. and Psychopath. 9: 120 (Oct.) 1928) draw attention to the existence of an atypical variety of *Leber's disease*, wherein positive neurologic signs were present in 4 persons of the same family, in addition to the optic atrophy and typical field changes. In 2 of the cases the condition was uncomplicated. One patient also showed a degree of mental deficiency and infrequent epileptic attacks, features which may be present occasionally. The fourth patient, in addition to the characteristics of Leber's atrophy, showed signs of pyramidal disease. The author postulates 4 groups: (1) Simple, uncomplicated heredofamilial optic atrophy, (2) familial optic atrophy in persons whose family shows a neuropathic tendency, migraine or epilepsy, (3) optic atrophy and neurologic signs coexisting, both appearing early in infancy or in early adolescence, (4) optic atrophy with heredofamilial ataxias of Marie. The association of neurologic findings may contribute to the knowledge of the etiology of Leber's disease, by suggesting that the essential pathologic process is a neuronoc abiotrophy, limited, in typical cases, to the optic nerve.

Lamb (J. Missouri M. A. 25: 415 (Sept.) 1928) states that of 559 pupils in attendance at the Missouri School for the Blind during the last 23 years, 84, or 15 per cent, have lost their sight from optic atrophy. Only those cases are included where visual disturbances occurred under 20 years of age. No case of Leber's hereditary optic atrophy was found. The author thinks there can be little doubt that the 44 cases of uncertain origin in his group were due to congenital syphilis.

R. Favier (Thèse de Paris, No. 439, 1927), who records 2 illustrative cases of hereditary and familial optic atrophy in brothers, maintains that this condition, first described in 1871 by Leber, who collected 55 cases, is not so rare as is supposed. Hormuth in 1900, obtained information about 74 families, which included 300 patients, of whom 131 submitted to medical examination. Other cases have since been reported by Klopfer, Buisson, Mathieu and Heinsberger. In the great majority of cases the condition develops as retrobulbar neuritis, and appears to have no other cause but a familial and hereditary predisposition, being characterized not by its symptoms or ophthalmoscopic appearance, which resembles those of toxic amblyopia, but by its peculiar course.

**TREATMENT**—Ludwig Winkler (Wien klin. Wchnschr. (Mar. 15) 1928) uses sulphur in cases of tabetic optic nerve atrophy as untoward results have been observed with malaria therapy. The sulphur is administered parenterally in the form of a 0.5 and 1 per cent emulsion of sulphur in olive oil. At the same time bismuth in the form of a 10 per cent bismuth subsalicylate emulsion in sweet al-

mond oil is given. Two of the latter injections are given followed by injections of sulphur and of bismuth simultaneously twice a week. An initial dose of 0.2 c.c. (4 minims) of the 0.5 per cent emulsion is given, and this dose is increased as necessary, but never beyond 3 c.c. (5 minims). Variations in temperature between 38° and 39.5° C (100.4° to 103.1° F) were observed. Periods of improvement up to 18 months were obtained in 3 cases.

**OPTIC NEURITIS—ETIOLOGY**—Optic neuritis not accompanied by increased intracranial pressure is due primarily, according to J. V. Paterson (Brit. M. J. 2 863 (Nov. 12) 1927), to inflammatory processes in the nerve or its sheath which may lead directly or indirectly to changes in the disc. The disc rapidly becomes less transparent and the lamina becomes invisible. The roots of the vessels are veiled by swollen nerve-fiber tissue. This veiling extends some distance from the disc. The color of the disc is more intensely red, the veins are likely to be distended, and the arteries are small. In a large group of cases the condition is due to toxins in the blood and the course and prognosis seldom appear to be modified by the presence or absence of visible changes in the disc.

Among the observations of W. T. Davis (Surg., Gynec. and Obst. 44 784 (June) 1927) regarding lesions of the optic nerve, the following may be mentioned. There is no reason to doubt that an intravaginal hemorrhage of the optic nerve may result from violence to the skull without a fracture. Loss of vision is due to (1) effusion of blood, (2) depressed

bone compressing the nerve, or (3) direct injury to the nerve itself.

In multiple sclerosis retrobulbar neuritis is a common complication, is not rapid in development, is frequently unilateral, and pursues an irregular course. It rarely results in complete blindness. The most important histological changes are in the nerve fibers, neuroglia, and blood vessels.

Unilateral secondary optic atrophy with hemiplegia on the opposite side of the body is probably due to thrombosis of the cavernous portion of the internal carotid artery. If there is an extension of the thrombosis or formation of an embolus the ophthalmic artery will become occluded.

In the epidemic form of meningitis, neuritis with atrophy takes first place among ocular symptoms. This is also true of tuberculous meningitis in which optic neuritis is the most common symptom.

In pachymeningitis interna hemorrhagica, a choked disc or a papillitis is frequently due to hematoma of the sheath of the optic nerve. Unilateral choked disc in this condition is a particularly valuable aid in diagnosis.

**DIAGNOSIS**—In the opinion of J. V. Paterson (Brit. M. J. 2 863 (Nov. 12) 1927), a careful study of the visual fields may be of great aid in determining the site and extent of the intracranial disturbance in optic neuritis. The results of lumbar puncture, x-ray examination, the Wassermann test, and the neurological examination must also be taken into consideration.

A. J. Ballantyne (Brit. M. J. 2 869 (Nov. 12) 1927) states that optic neuritis is usually manifested by (1) papilledema associated with intra-

cranial tumor, meningitis, and other cerebral conditions, and (2) optic neuritis or neuroretinitis of renal disease.

The optic neuritis of meningitis differs from cerebral tumor in being less prominent and more diffuse, but in tuberculous meningitis the disc swelling is likely to resemble that of intracranial tumor, being higher and more circumscribed.

**TREATMENT**—E. C. Sewall (Ann Otol, Rhinol and Laryng 37 839 (Sept.) 1928) has perfected an operative procedure for the relief of nerve compression in the optic canal. Anesthesia is induced by means of **scopolamine** and **morphine sulphate**, the injection of 1 per cent **novocaine**, and the intranasal application of **cocaine** crystals. An incision similar to that which he used in the ethmoid-sphenoid-frontal operation is modified to make a skin-mucous membrane osteoplastic flap. After removal of the upper and inner canal walls there is no longer any danger of pinching the nerve.

Cases of increased intracranial pressure with changes in the disc should be operated upon early. Paterson (*loc cit*) considers when once the stage of optic atrophy is reached, operative treatment is disappointing. Medical treatment seems to offer a prospect of cure only in definitely luetic cases.

**RETROBULBAR NEURITIS**—H. Ronne (Brit M J 2 866 (Nov 12) 1927) states that the terms "choked disc" and "neuritis optica" are used chiefly as morphological expressions. He believes it is quite hopeless to attempt an ophthalmoscopic differential diagnosis between inflammation and edema of the optic nerve. In the retrobulbar neuritis

group he includes chronic toxic amblyopia, Leber's hereditary neuritis optica, the usual acute typical retrobulbar neuritis, and the violent diseases of the optic nerve which sometimes introduce or accompany disseminated myelitis.

Of the common clinical features of these diseases which belong to the retrobulbar neuritis group, the most constant is the negative central scotoma. The more acute forms are characterized by violent onset accompanied by pain in the temples, pain on movement of the eyeballs, and sensitiveness to pressure on the eyeballs. There is a more or less definite tendency toward recovery. Disseminated sclerosis may be manifested both by acute diseases of the optic nerve and by quite slowly developing atrophy resembling intoxication amblyopia. The prognosis in the group of diseases under discussion is rarely quite hopeless.

**ETIOLOGY**—Rosa Ford (Brit M J 2 718 (Oct 19) 1929) gives an account of 2 cases of retrobulbar neuritis attributable to a latent sinusitis which every usual method of diagnosis had failed to detect. She points out the necessity for more refined methods of diagnosis in chronic sinus disease and suggests that with improved technic retrobulbar neuritis might be attributed to sinus infection.

Chronic retrobulbar neuritis is the most common of the optic nerve affections found associated with pregnancy, according to Ballantyne (*loc cit*). Much has been written on the rôle played by intranasal conditions in its etiology, but there is as yet no agreement with regard to the following problems: (1) The type of nasal disease which gives rise to optic neu-

iritis, (2) the clinical characteristics of optic neuritis due to disease of the nose and nasal sinuses, (3) the period at which operative intervention is indicated, (4) the operation of choice and (5) the manner in which operation causes improvement or cure.

Multiple sclerosis probably accounts for a larger percentage of cases of retrobulbar neuritis than diseases of the nasal sinuses

With regard to the question of the operative *treatment* of these cases, he is inclined to adopt a conservative attitude. He believes that it is usually safe to recommend medical treatment for from 6 to 8 weeks

G Weill (Arch Ophth 1 307 (Mar) 1929) believes that acute retrobulbar neuritis is practically never associated with posterior sinusitis and therefore surgical intervention is not indicated. The prognosis for the return of vision is good, almost total restitution of vision occurring in 85 per cent of the cases. The cause of the condition in Weill's opinion is multiple sclerosis

K S Oliver and S J Crowe (Arch Otolaryng 6 503 (Dec) 1927) state that acute neuritis of the optic nerve may result from syphilis, tuberculosis, acute infectious diseases, multiple sclerosis and infection of the accessory nasal sinuses

Changes in the papillomacular bundle may result in an absolute central scotoma for form and color and marked loss of visual acuity. If the inflammation continues, absolute blindness may result from the secondary optic atrophy. For cases due to infection of the accessory nasal sinuses, they advise operative procedures and report 10 cases

**TREATMENT**—P Watson-Williams (Brit. M J 2 1030 (Dec 8) 1928) reports a case in which ocular disturbance began with iritis in the right eye. Later optic neuritis developed in the left eye. After **drain-**ing a purulent left antrum and a small left **sphenoidal sinus** the optic neuritis subsided and normal vision was restored

**PAPILLEDEMA — ETIOLOGY**—J Lévy-Valensi, A Lamache and J Dubar (Médecine 10 122 (Feb) 1929) report 2 cases of edema of the optic disc with retinal arterial hypertension which occurred several days after a spinal puncture. Because symptoms of an instability of the sympathetic nervous system were observed in both patients before spinal puncture was performed, they think that the condition was of vasomotor origin

G W Swift (Northwest Med 26 579 (Dec) 1927) cites cases of choked disc resulting from aneurism and thrombosis of large basilar arteries, skull fractures with cerebral damage, influenzal pneumonia with resultant engorgement of the brain and stagnation in the intracranial sinuses, and acute pneumonia with edema and an increase in the intracranial pressure

In cases of tumor of the optic nerve, atrophy results, but papilledema does not develop, because there is no interference with the venous return. Aneurism of the circle of Willis produces choked disc only when the venous sinuses are blocked. Lesions in the cerebellopontine angle produce first unilateral, and later, bilateral choked disc. Blockage of the transverse sinus results in choked disc early if the large sinuses are cut off or the aqueduct of Sylvius is obstructed, with resultant hydroceph-

alus These lesions are associated with a higher intracranial pressure than lesions situated elsewhere

#### ORBIT.—INFLAMMATION.—

E D D Davis (J Laryng and Otol 44 164 (Mar) 1929) found that the commonest cause of orbital inflammation of nasal origin was suppuration of the frontal sinus in adults (16 cases) and ethmoidal suppuration in children (7 cases) In no instance was the orbital involvement due to extension of the infection from the maxillary or sphenoidal sinuses Frontal sinus suppuration, when it involves the orbit, produces a characteristic downward and outward displacement of the eyeball, whereas ethmoidal suppuration displaces the eyeball outward and forward Diagnosis is made on intranasal examination, radiography and differentiation from cysts, mucocele and neoplasm

The *treatment* depends on the source of infection and the presence or absence of an orbital abscess If an *abscess* is present, immediate *incision* and *drainage* of both the abscess and the affected sinus is indicated If the orbital inflammation is *non-suppurative*, *drainage* of the affected sinus usually suffices Occasional complications are cavernous sinus thrombosis and secondary optic atrophy

**TUMORS**—M L Hine and R B H Watt (Brit J Ophth 12 513 (Oct) 1928) report a case of *neurofibromatosis* of the right orbit in a man 26 years of age The right upper lid was enormously thickened and the right lower lid was sodden and ulcerated The skin and underlying tissue in the right temporal and the right occipital region was similarly thickened The eye was blind, the

cornea being opaque, and showed considerable surface vascularization, otherwise it was apparently normal The left eye and eyelids were normal

As the conjunctival discharge and ulceration of the lower lid could not be controlled and the right eye was blind, *enucleation* was performed with removal of a large part of the upper lid and the lid margins were sutured together Recovery was uneventful Microscopic examination of the tissues showed that practically all parts of the eyeball and orbital contents were involved in the neurofibromatosis

H D Lamb (Arch Ophth 57 425 (July) 1928) has been able to find the report of only 1 case of *myxoma* of the orbit in the literature, a case reported by Fuchs in 1914 The case described by the author was that of a 16 year old girl The neoplasm involved the right eye and had caused marked exophthalmos, choked disc of 6 diopters, and enlargement of the bony orbit The pupil was moderately dilated but reacted to light Vision was reduced to the counting of fingers

The tumor was exposed by a brow incision It seemed to arise from the sphenoidal fissure above the optic nerve

Examination 1 year after the operation revealed enophthalmos with little ptosis, partial paralysis of the right superior rectus and right inferior oblique, normal vision, and no recurrence of the growth

R W Bledsoe (Am J Ophth 11 21 (Jan) 1928) reports the case of a boy 11 years of age, who presented a swelling of the right upper eyelid The skin was loosely attached to a hard nodular mass At operation, the

mass was found to be a *perithelioma* apparently springing from the roof of the orbit. Death followed several local recurrences and post-mortem examination revealed extensive intracranial masses of tumor but no other metastases.

In discussing the diagnosis between *endothelioma* of the orbit and *glioma*, L L Mayer (Am J Ophth. 11 617 (Aug) 1928) states that in cases of *endothelioma* the patient's age is greater, the exophthalmos more often precedes the visual disturbance, the neoplasm causes limitation of movement, obstruction of the circulation in the lids and conjunctiva, and pain, and there is intraocular extension of the lesion.

G T Pack (Arch Ophth 57 246 (May) 1928) in a discussion of radiation therapy of *cancers* of the orbitopalpebral region, says that he performs a biopsy immediately, to determine the nature and radium sensitivity of the neoplasm. When the radiation dosage is too great or insufficient or incorrectly timed or spaced, a tumor may develop radio-resistance which persists indefinitely. The efficacy of radiation treatments diminishes rapidly with the number of treatments. An improper first treatment may render a neoplasm incurable by radiation. The x-ray is never successful after radium has failed, but recurrences following x-ray treatment are sometimes susceptible to radium treatment. Therefore it is best for x-ray treatment to precede radium treatment.

Carcinomata of the orbitopalpebral region may be classified as follows (1) those limited to the eyelids, (2) those originating in the eyelids but finally extending into the periorbital

region, (3) those developing in the skin of the orbital region but not invading the eyelids, and (4) those invading the orbit of the eye.

*Epitheliomata* of the commissures, particularly those of the internal commissural region, are of considerable gravity because of their early tendency to spread along the internal and external walls of the orbit.

According to their histological structure, cancers of the orbit may be classified as (1) epidermoid epitheliomata, (2) non-epidermoid epitheliomata, and (3) intermediate types.

**ORIENTAL SORE.**—That *cutaneous Leishmaniasis* may be transmitted by insects still remains to be proved. S Adler and O Theodor (Ann Trop Med 23 1 (Apr) 1929) performed a careful series of experiments and were unable to demonstrate any positive evidence of insect transmission.

During the last few years the literature of tropical medicine has been replete with suggestions for the treatment of oriental sore. **Antimony**, especially in the form of tartar emetic is the suggestion of Vianna (Arch Brazil de med 2 426), while **x-rays** have been proposed by Easton (J Roy Army M Corps, vol xxxv).

**Salvarsan** has been suggested by A Dostrowsky (Arch f Schiffs-u Tropen-Hyg 33 417 (Aug) 1929) who calls attention to the frequency with which a positive Wassermann is found in kala-azar. **Splenectomy** is indicated to relieve the symptomatic distress caused by the large spleen in the visceral forms of this disease. W Bisset (J Roy. Army M Corps, 52 131 (Feb) 1929) reports a dramatic re-



covery in an apparently hopeless case by the intravenous use of urea stibamine in 0.05 Gm ( $\frac{5}{16}$  grain) doses every second day for 3 weeks

**OROYA FEVER.**—H. Noguchi, H. R. Muller, E. B. Tilden and J. R. Tyler (J. Exper. Med. 50: 355 (Sept.) 1929) report a series of experiments on monkeys on the effect on the course of the fever of (1) small quantities of immune serum from rabbits simultaneously injected with living cultures, (2) a large dose of convalescent monkey serum 24 hours prior to inoculation, (3) a similar preliminary dose later followed by 3 injections of the serum and (4) 3 large doses of convalescent serum following inoculation, with the following results. The convalescent serum was found (1) to prevent the multiplication of *Bartonella bacilliformis* in the blood in most of the animals and (2) the serum delayed the development of the characteristic skin lesions for considerable periods when given before inoculation. In the case where the serum treatment was not begun until the skin lesions had appeared, no effect on the progress of the nodule was noted even though the blood became bacteria free.

**ETIOLOGY.**—H. Noguchi also reports (J. Exper. Med. 47: 165 (Jan.) 1928) the discovery of a minute, pleomorphic, motile, Gram-negative bacterium which he isolated from 2 specimens of nodular tissue of Oroya fever. He regards this as a new species of bacterium inasmuch as no previous one similar to this one has been described, and because it was obtained in Peru, he has given it the name of *Bacterium peruvianum*.

**TREATMENT.**—The therapeutic effect of several chemicals possessing antiparasitic qualities on experimental verruga peruana has been described by H. Noguchi (J. Exp. Med. 48: 619 (Nov.) 1928). The drugs were administered intravenously according as the nodules were already developed to an approximate maximum or were still in the active period of growth. The effect of the drugs varied accordingly. When the nodules were mature the regressive process was quickened, but in cases where the growth of the lesions was still active, no action could be detected. *Bartonella bacilliformis* in culture is destroyed by numerous chemicals used therapeutically, especially formaldehyde and acriflavine base.

**ORTHO-IODOXYBENZOIC ACID.**—I. M. Bowers (Northwest Med. 28: 298 (July) 1929) reports the results obtained in the treatment of 51 cases with the ammonium salt of ortho-iodoxybenzoic acid. The majority of the patients presented long standing or very severe arthritis. Four cases were of the acute type. The longest duration of symptoms was 37 years, the shortest 6 weeks, the average being 6 years. The chronic cases showed varying degrees of incapacitation and deformities. The great majority of the patients belonged to the group with proliferative arthritis. In 4 instances the development of arthritis was coincident with the menopause. The first step in the management of these cases was to institute a careful search for all demonstrable foci of infection. The tonsils were regarded as a probable focus in 29 cases, the teeth in 24 cases, the sinuses in 15 cases, the bowel in 15 cases, the prostate gland in 8 cases, the gall-bladder in 7 cases, and the female pelvic organs in 5 cases. When infectious foci were found, an attempt was made to treat them appropriately. Twenty-five of the patients had various operations for the removal of probable foci of infection. In

12 cases with marked impairment of function, physical therapy was continued throughout the course of treatment. These measures consisted of baking, massage, steam baths, diathermy, light treatments, passive movements and exercise. Orthopedic appliances were used in only 2 cases.

Intravenous injection is the method of choice in administering ortho-iodoxybenzoic acid. The standard dosage is 1 Gm (15 grams) of the salt dissolved in 100 c c ( $3\frac{1}{2}$  ounces) of warm physiologic solution of sodium chloride, given twice during a week. For the first injection it is desirable to give only 0.5 Gm ( $7\frac{1}{2}$  grams) as a precaution against a severe reaction. It is injected by the gravity method and must be introduced slowly, from 10 to 15 minutes being allowed for the 100 c c ( $3\frac{1}{2}$  ounces) to enter the vein. Marked improvement was observed in 12 cases, moderate in 17, slight in 15, and no improvement in 7.

**OSTEOARTHRITIS OF THE SPINE — DIAGNOSIS** — Stress is laid upon the referred pain as manifested in this condition, it is always to be remembered that pain about the chest, abdomen and the lower extremities (sciatica) may be due to osteoarthritic involvement of the spine.

L. Gunther and J. J. Sampson (J A M A 93 514 (Aug 17) 1929) state that cutaneous pain may be the expression of a pathologic process in the posterior nerve roots, it may also be referred from visceral disease. The differentiation is not always easy and at times developments must be awaited. "Pain over the heart" has been studied in 70 cases of hypertrophic osteoarthritis of the upper thoracic spine. They conclude that precordial pain of nerve root origin is delineated in broad belt-like zones along well defined spinal root dermatomes. It is constantly present in the back of the chest as well as over the precordium. Nerve root pain

does not respond to vaso-dilators such as the nitrites. The response of this group to effort is good and the associated phenomena of cardiovascular disease do not dominate the picture.

L. Gunther and W. J. Kerr (Arch Int Med 43 212 (Feb) 1929), in commenting upon the *radicular syndrome* show that the referred pain attributed by Von Bechterew to pachymeningitis with mechanical compression of the nerve roots, is due, in their belief, to (1) movement of the spinal column, (2) relaxation of the supporting musculature of the spinal vertebrae and (3) mechanical factors which increase intraspinal pressure, such as coughing and sneezing.

**OSTEOMALACIA. — ETIOLOGY** — The recent literature on osteomalacia deals principally with the etiology, 2 theories being paramount. (1) nutritional, placing it in the category of rachitis, (2) endocrine, the thymus and ovary being mentioned.

J. R. Fraser (Am J Obst and Gynec 14 697 (Dec) 1927) reviews various factors concerning the ovary in osteomalacia and concludes that ovarian hyperactivity may in some manner cause the disease.

**TREATMENT** — J. A. Mathez (Rev méd de la Suisse Rom 49 158 (Mar 10) 1929) and J. Goldstein (Wien klin Wchnschr 42 202 (Feb 14) 1929) both mention the beneficial effects of vitamin D, using irradiated cod-liver oil, while H. L. Blumgart (Trans Assoc Amer Phys, J A M A 93 62 (July 6) 1929) also expresses the opinion that a deficiency of vitamin D is the cause

**OTALGIA.—ETIOLOGY.**—Earache may be of a referred nature due to a gumma of the pharyngeal wall of the Eustachian tube, diseased wisdom teeth, a gumma of the larynx, tonsillar infection, or sphenoidal disease.

Angiospastic pains in the ears may be present. The spasms of the arteries in these cases may be of vasomotor or of arteriosclerotic nature. According to Stein (Wiener Klin Wchnschr 41 1453 (Oct) 1928), the vasomotor disturbances are mostly neurasthenic in origin. Endocrine anomalies may be a frequent cause.

**SYMPTOMATOLOGY**—Phenomena of irritation of the sympathetic nervous system, such as *increased pulse rate, palpitation, feeling of anxiety, tremor* and *rise in blood-pressure*, may accompany the ear pains, especially when these occur in girls and women, just before menstruation. Hypertension on a nervous basis was present in a considerable number of Stein's patients with angiospastic otalgia. In cerebral arteriosclerosis the sensations in the ear are usually unilateral and may be described as *pressure, tension* or *stabbing* or *spasmodic pains*. The attack may last only a few seconds or several minutes, sometimes longer. The *pain* is usually moderate in intensity. Angiospastic otalgias may be manifested merely by *paresthesias, sensation of cold or heat, or itching*.

**TREATMENT**—Psychic treatment is of value. Measures to relieve the peripheral vessels and establish a regular circulation in the ear should be undertaken. In cases of arteriosclerotic diseases of the middle ear, theobromine sodium salicylate may be used with advantage and the

nitrates may be employed to lower vasomotor tonus. He has seen good results from diathermy.

**OTITIS MEDIA.**—Otitis media is usually secondary to nose and throat infections. It is quite commonly found in the acute infectious diseases, especially the exanthemata. The streptococcus is the organism most frequently found, the staphylococcus comes next, with the influenza bacillus and the pneumococcus following in order.

A syndrome of intestinal disturbances produced by otitis media in infants has been described frequently during the past few years and D. M. Lierle (Ann Otol Rhin and Laryng 36 604 (Sept) 1927) reviews a group of 100 cases. The infants develop a condition resembling cholera infantum. They become critically and suddenly ill, with marked dehydration, loss of weight, high fever, diarrhea and periods of syncope. Examination of the ear shows drumhead changes or bulging of the posterior superior walls. In 92 of the cases reviewed, these findings were bilateral and there was associated paranasal sinus disease.

In cases presenting the above symptoms early and frequent examinations of the ears and paranasal sinuses should be made.

From observations made on a series of 275 patients, W. Hesse (Ztschr f Hals-, Nasen- u. Ohrenh 22 372 (Jan 7) 1929) is convinced that predisposition to the occurrence and spread of suppurative lesions of the middle ear and mastoid cells depends to a large extent on both constitutional and anatomic factors. Those cases due to streptococcus mucosus

were particularly severe in adults. The prognosis of an infection in the tympanic cavity depends on the type and virulence of the causative bacteria, the hematologic and serologic findings of the patient, and the local and anatomic and pathologic conditions as revealed by x-rays or encountered at operation.

According to G. Busacca (*Arch internat de laryng* 35 295 (Mar) 1929), fusospirochetes are found only in chronic suppurations of the ear, and are present in about 25 per cent of such cases. In those cases in which they predominate over other bacteria, or are found in nearly pure culture, **neosalvarsan** applied locally or administered by intravenous injection is beneficial. In about half of the cases of very old chronic suppuration resistant to ordinary measures it will effect a cure. Salvadori found the most efficacious treatment to be an ear bath of a 1 to 3 per cent solution of neosalvarsan.

G. H. Cox and J. G. Dwyer (*Arch Otolaryng* 9 414 (Apr) 1929) found that in more than 15 per cent of cases of chronic discharge from ears the discharge is due to aural tuberculosis. Infection of the ear by the bovine type of tubercle bacillus is common. The disease is characterized by an insidious onset, a painless discharge, multiple perforations, and slight deafness.

In the 3 cases of primary tuberculosis of the middle ear in early infancy, reported by H. Kleinschmidt and P. Schurmann (*Monatschr f Kinderh* 40 193 (Sept) 1928), the disease appeared between the sixth and eighth weeks of life. The first symptom was swelling of the glands in front of and beneath the ear. Running of the ear soon followed and granulations ap-

peared in the auditory passages. In 2 cases there was facial paralysis. The Pirquet skin test was positive, all the children died. The anatomic conditions for passage of bacilli through the Eustachian tube are better in the first weeks of life than later. Primary tuberculosis of the middle ear in adults is not known.

In his sanitarium practice, S. J. Chapman (*Ann Otol Rhin and Laryng* 36 631 (Sept) 1927) sees from 4 to 6 cases of tuberculous otitis media per 100 patients. In most cases it begins insidiously with aural discomfort. Inflammation of the drum is ordinarily of a low grade, and, in adults, mastoid tenderness is uncommon unless mixed infection is present. Facial paralysis is a fairly common complication but labyrinthitis and meningitis are less frequent. According to this writer, **heliotherapy** is of a definite value. The sunlight is reflected by means of a modified solar laryngoscope. The patient treats himself, beginning with a half-minute exposure once a day up to 15 or 20 minutes.

W. C. Warren, Jr. (*Arch Surg* 18 1552 (Apr) 1929) states that 1 out of every 4 cases of chronic infection and 1 out of every 9 cases of acute infection of the middle ear, present an intracranial complication.

The symptoms are usually headache, vomiting, vertigo, fever and disturbed pulse, temperature and respiration ratio. The 3 most common types of intracranial complications are lateral sinus thrombosis, abscess of the brain, and meningitis. In cases of lateral sinus thrombosis, chronic mastoiditis and cholesteatomata are the most common causative factors. The majority of abscesses of the brain

occur near the diseased area of bone forming the pathway of intracranial infection. Meningitis is characterized by extreme restlessness, severe headache, picking at the bedclothes, high temperature with rigidity of the muscles of the back of the neck and, later, photophobia.

E. Ruttin (*Acta oto-laryng* 12 198 (Jan) 1928) states that x-rays have a 2-fold purpose in the diagnosis of chronic otitides: (1) The demonstration of the normal anatomical details, and (2) the demonstration of pathological changes. These details are shown more clearly by a contrast medium. The author injects a 40 per cent solution of iodipin into the attic and antrum, while the patient bends the head in the opposite direction, and occludes the external auditory canal with a wad of cotton soaked in the iodipin solution. The x-rays are then taken in various positions and these will show more or less irregular or protruding limitations and even destruction of bone in the attic or antrum. Cholesteatomata show lighter areas, which are sharply demarcated by dark portions of the contrast medium and should also show a dentated external contour.

**TREATMENT**—In the treatment of acute infections of the middle ear, A. I. Schwartz (*Arch Otolaryng* 9 185 (Feb) 1929) uses **vacuum suction** applied by a special tube devised for the purpose of relieving pus under pressure, thus insuring better drainage. In a series of 1200 cases in which the method was used, the results were very gratifying. Only 19 patients of this series were operated on for involvement of the mastoid. In patients in whom tenderness of the

tip is shown, this method is not of any value as a preventive.

Since the ear infections are usually due to nose and throat disorders, it is necessary to eradicate any foci of infection in the nose and throat in the treatment of *chronic middle ear disease*. Attic suppurations, with perforation in Shrapnell's membrane, is apparently due to faulty drainage, resulting from the mucous membrane folds between the ossicles and the attic walls. Among the various solutions that are used in the attempt to dry up a chronic suppurating ear, **Calot's solution** has proven to be exceedingly efficient. The solution contains **guaiaccol, 1, creosote, 5, sulphuric ether, 30, iodoform, 10, and olive oil, 70**. I. Harnick (*Canad M A J* 20 503 (May) 1929) states that the ear should first be cleansed of all secretions that may be present at the time. After the bottle has been carefully shaken, from 5 to 10 drops of Calot's solution is instilled into the canal of the affected ear. In order to get the disinfecting fluid into the Eustachian tube, tragus massage is employed. This procedure is carried out every night for a week. Nothing else is done. In a series of 68 cases excellent results were obtained in 57. The solution is of very little value in those cases complicated by cholesteatomata. Its use must be intermittent, and insufflations of **boric or zinc oxide powder** are used to round off the treatment.

**OTOSCLEROSIS**.—An organized effort has been made in the last 2 years by a special committee of the American Otological Society to study the basic fundamentals of otosclerosis. A complete resume of the litera-

the etiology of otosclerosis and suggests antiluetic therapy as a prophylactic therapeutic agent. In describing the pathology of 6 patients with acquired syphilis, he found lesions similar to those found in otosclerosis.

Doederlein (Ztschr f Hals-, Nasen- u. Ohrenh 22 293 (Nov 10) 1928) concluded from the minute histological examination of 6 cases of otosclerosis that the disease is not of an inflammatory nature, but rather is similar to rickets and osteomalacia, these conditions being due to general causes. Otosclerosis is regarded in the same category, *ie*, as a deficiency disorder.

**CLINICAL FINDINGS** — L. A. Leeson (J Laryng and Otol 43 89 (Feb) 1928) offers the following facts in reference to the series of cases which he studied. Sex 73 per cent females, 27 per cent males. Age 290 patients were under 20 years of age, 298 between 20 and 30 years, and 419 over 30 years. Familial deafness occurred in 36 per cent. Deafness alone in 1003 cases. Tinnitus in 644 cases. Giddiness in 74 cases. The drum membrane 910 cases were normal, in 114 cases there was congestion of the promontory, and in 104 there was an abnormal drum head. The Eustachian tube was patent in 497 cases and in 81 it was slightly obstructed. The majority were not improved by inflation.

Similar observations reported by F. R. Nager (J Laryng and Otol 43 15 (Jan) 1928), who analyzed a series of 835 cases, in which the sex ratio was 1 male to 1.8 females, the age at which the disease came on was in the third decade, but about half of the patients studied recalled the onset as early as 15 years of age. An heredi-

tary element appeared in 58.6 per cent of the cases. In 30.6 per cent of these cases unilateral involvement occurred, and in 95 per cent of all the cases, a progressive tendency was found. Tinnitus occurred in 68 per cent, the drum findings were normal in 70 per cent, and in 20 per cent there was a red glow of the promontory. Of this series studied, less than 50 per cent of the females were married, and in 16 per cent of those married, pregnancy did not alter the condition, whereas 46 per cent exhibited a change for the worse only after repeated pregnancy. From these findings the author concludes that pregnancy as affecting otosclerosis one way or another is over stressed.

In otosclerosis, the patient not infrequently states that he can hear better in a noisy place, a symptom known as *paracusis Willisii*. In discussing this symptom G. E. Shambaugh (Arch Otolaryng 6 228 (Sept) 1927) states that with normal individuals, the acuity of hearing is diminished by extraneous sounds. This decrease is apparent throughout the whole tone range, but is greater as the tone range becomes lower. A hearing defect due to stapes fixation is increased, rather than decreased, by extraneous sounds. In a noisy environment, the individual with normal hearing unconsciously raises his voice to overcome the noise, whereas the deaf individual, because of stapes fixation, does not experience a handicap, because the deafness for low tones effectively shuts out most of the extraneous noises. This explains why a deaf person, while riding on a train, frequently hears the voice better than an individual with normal hearing. The tympanic membrane is normal in

the majority of cases, as shown by Leeson and Nager, but in a minor percentage, the reddish glow known as the Schwartze sign, due to hyperemia of the promontorium, is seen

Using the *tuning fork test*, the Bezold triad stands out (1) prolongation of bone conduction for low tones, (2) a marked loss of the perception of low tones by air conduction, and (3) the Rinne test is decidedly negative, *i e*, the bone conduction is increased over air conductivity. Furthermore, the Weber test is lateralized toward the affected or deaf ear, and the perception for high tones becomes involved relatively late in the disease. The Eustachian tube is usually found to be patent upon inflation in the majority of cases.

**TREATMENT**—At the present time there is no satisfactory treatment for otosclerosis. If hypofunction of one or several of the endocrine glands is evidenced, then glandular therapy may arrest or prevent the further progress of the disease. Watson-Williams (Lancet 1 814 (Apr 20) 1929), in 18 cases, showed definite improvement of subjective symptoms from the administration of desiccated **parathyroid** substance from 1½ to 2¼ grains (0.09 to 0.14 Gm) daily, without regard to objective findings. Improvement occurred even after numerous other methods of treatment had proven of no avail. In a few cases pain occurred in the ear, but no other symptoms of intolerance were noted. Without the use of any other therapeutic measure, Watson-Williams attained complete improvement in 3 cases, marked improvement in 8 cases, some improvement in 2 cases, and little or no improvement in 5 cases.

A. A. Gray (J Laryng and Otol 43 21 (Jan) 1928) noted the presence of anemia and chlorosis commonly associated with otosclerosis and next to these factors, focal infection was most frequent. When cases present these conditions, it is possible that the otosclerotic factors may be less severe when these associated conditions are diminished or eliminated. General hygienic measures of proper diet, proper elimination, proper rest and proper bathing with avoidance of fatigue, and overheating are of importance.

*Prophylactic measures* of a general and local nature should be instituted in all persons exhibiting an hereditary predisposition to progressive deafness or who reveal a weak endocrine complex. In all cases, whether from the standpoint of prophylaxis or the treatment of early or advanced cases, septic foci should be eliminated. Tubal inflation is of doubtful utility in these conditions, and when often repeated, inflation may have a detrimental action. When the deafness has become advanced and incurable, the problem assumes the proportions of a social factor and the individual should be taught lip reading, etc.

**OUABAIN.—ADMINISTRATION AND DOSE**—H. Vaquez and R. Lutembacher (Presse med 36 129 (Feb 1) 1928) prefer ouabain to digitalis where there is pronounced, persistent dilatation of the heart, in such cases digitalis, while slowing the heart rate and overcoming arrhythmia, fails to dispel edema and oliguria because it is unable to reduce the size of the heart. Some patients with fibroid lungs or spinal curvature, are refractory to digitalis from the start, in these cases, attended with insufficiency of the right side of the heart, but no disturbance of rhythm, ouabain may advantageously be substituted for digitalis. Ouabain is not contraindicated in

cardiorenal cases Intravenous injection is the procedure of choice in acute cardiac insufficiency; intramuscular use, besides being painful, partly annuls the action of the drug because the latter becomes fixed in the muscle into which it is administered In acute insufficiency with or without an-ginal pain or acute edema of the lungs, free venesection is first in order and is to be immediately followed by intravenous injection of 0.25 mg ( $\frac{1}{250}$  grain) of ouabain, second and third like doses are to be given at 12 hour intervals, and a fourth dose after an interval of 24 hours In refractory cardiac insufficiency the 4 doses may be given on 4 successive mornings In cardiorenal cases, Ribierre and Giroux, Clerc and Bas-courret give ascending doses—0.125 mg ( $\frac{1}{800}$  grain) on the first day, 0.25 mg ( $\frac{1}{250}$  grain) on the 3 or 4 succeeding days and finally 0.5 mg ( $\frac{1}{25}$  grain) after 1 day's rest Following the ouabain with digitalis, after an interval of 2 days is indicated in irreducible insufficiency in which digitalis had lost its effect previous to the use of ouabain By the mouth, ouabain is less active, but may be given in the amounts of 50 drops a day of a 1:1000 solution or 10 to 20 drops of a 1:250 solution Syn-chronous use of ouabain and digitalis is il-logical Rest in bed and a milk or salt free diet should, of course, be employed during ouabain treatment

**OVARY, INTERNAL SECRE-TIONS OF.**—The dual nature of the internal secretions of the ovary has been firmly established as a result of recent studies of the function of the Graafian follicle and the corpus luteum These investigations have demonstrated that 2 hormones are elaborated (1) the follicular hor-mone which produces all the growth phenomena in the Mullerian tissue and breast, and (2) the corpus luteum hormone which sensitizes the endo-metrium and inhibits ovulation

**“FEMALE SEX HORMONE.”**—The results of the intensive study of the chemical composition and nature

of the “female sex hormone” have proved disappointing

**DEFINITION**—It appears that the active substance is not a lipid, but is carried along by lipoids Biologically it is an anabolic hormone which shows activity, in minute concentra-tions, limited to the Mullerian tissue and the breasts

**ALLEN AND DOISY TEST**—E Allen and E A Doisy (J A M A. 81:819 (Sept 8) 1923) have shown that the injection of a potent extract of “female sex hormone” into imma-ture or castrated rats or mice is fol-lowed in 48 hours by the appearance of estrus The vaginal walls become thickened and cornified Three in-jections should be distributed over 1 day at 4-hour intervals

R T Frank and M A Goldberger (J A M A 90:376 (Feb 4) 1928) have subdivided this reaction as read by the vaginal smear on a scale of 0 to 4

0 = untreated castrate-smears show leukocytes and mucus and a few nucleated epithelial cells

1 = negative predominance of leu-kocytes, increase in nucleated epi-thelial cells

2 = negative numerous leukocytes, predominance of nucleated epithelial cells

3 = threshold reaction nucleated epithelial cells, no leukocytes

4 = positive reaction cornification, epithelial non-nucleated scales ex-clusively

**TECHNIC OF EXTRACTION FROM BLOOD**—According to Frank and Goldberger (*loc cit*), a simplified method of extracting the hormone from the blood is as follows Forty c.c. of venous blood are mixed with anhydrous sodium sulphate, pulver-



ized and extracted twice with ether. The ether soluble residue is rubbed up with 2 c c of water to form an emulsion which is then ready for injection. The watery emulsion is injected in 3 equal portions at 3 to 4 hour intervals into a previously castrated adult white mouse, the castration having been performed at least 14 days previously. A vaginal spread is made 24 hours after the last injection.

**HORMONE IN THE BLOOD OF NORMAL WOMEN**—Frank has studied the sex hormone content of the blood of non-pregnant women in different stages of the sex cycle. He found that more and more hormone accumulates in the blood until menstruation sets in, disappearing with the onset of that process or the beginning of pregnancy. The highest concentration is noted at the end of the premenstrual stage, when 1 mouse unit may be present in every 40 c c of blood. The hormone is found in great concentration in menstrual blood, a mouse unit being obtained in 4 or 5 c c.

**HORMONE IN THE BLOOD IN PREGNANCY**—In the first 8 weeks of gestation there is a low hormone level in the blood. According to Frank ("The Female Sex Hormone," Springfield, 1929), this is due to the fact that the secretion of the corpus luteum is utilized by the growing mucosa. After this period the chorionic epithelium begins to produce hormone in large quantities. Zondek, in 1928, found that as high as 10,000 mouse units may be excreted daily in the urine, while the blood maintains a level of 1 to 2 mouse units per 40 c c.

The value of the test in the *diag-*

*nosis of early pregnancy* may be summarized in the following table.

1 to 4 weeks	5 per cent positive
5 to 8 weeks	73 per cent positive
9 to 16 weeks	84 per cent positive
17 weeks to term	90-95 per cent positive

It is evident that the test has decided value after the eighth week of gestation. If the pregnancy is terminated at the end of the twelfth week, the hormone disappears from the blood immediately. The test is of value, therefore, in demonstrating the viability of the fetus.

The "female sex hormone" is found in the amniotic fluid, in the cord blood, and especially in the fetal liver. As it is not found in the fetal ovary, it is believed that the stimulus to fetal genital growth comes from the mother. When the placenta is expelled, there is an abrupt drop of the hormone level in the circulating blood, persisting during lactation unless menstruation is re-established.

As the follicles, corpus luteum and placenta elaborate the same hormone necessary for the successful continuation of pregnancy, Frank and Gustavson have called this triad the "gestational gland."

**Amenorrhea**—According to Frank (*loc cit*), the absence of menstruation is accounted for by the failure of "loading" of the endometrium which, theoretically, may result from underproduction or overexcretion of female sex hormone. The decision of the gravity or transient nature of the condition will rest on the determination of the hormone blood picture. Frank subdivides amenorrhea into 3 groups.

1 Entire absence of cycle. The entire absence of a quantity of hormone necessary to give a positive re-

action denotes an unfavorable prognosis with respect to improvement or cure

2 Regular subthreshold cycle The presence of cyclical blood variations every 4 weeks, although weak in quantity, offers a favorable outlook

3 Irregular cycle Self-limited In this condition one can predict with considerable certitude when menstruation is impending

The function of the ovaries, Frank claims, may be determined by this test A high amount of "female sex hormone" in the blood may show a hyperfunction of the ovaries such as might occur in precocious puberty or in endocrine disturbances

The presence of cyclical blood variations in patients in whom the sex is doubtful would determine femininity

Patients after hysterectomy in whom the ovaries are left *in situ*, have a regular blood cycle The excretion of the hormone must take place, therefore, by channels other than the menstrual blood

"Female sex hormone" may be noted in the blood, urine and bile of males, but is neither constant nor cyclical in occurrence Frank believes that its presence in the bile of senile males is due to the ingestion of vegetable foods in which the hormone is present in great quantity and to its absorption by the liver

**HORMONES OF THE CORPUS LUTEUM**—Animal experimentation seems to prove rather conclusively that the ovarian follicular hormone or "female sex hormone" is not the only hormone produced by the ovary According to the investigations of Corner, Leo Loeb, Hisaw, Papanicolaou and Frank, the corpus luteum

elaborates 2 hormones simultaneously, namely

I A characteristic water soluble hormone in many respects antagonistic to that of the follicle Its function is twofold, as follows

(a) Sensitizing hormone (imbedding of the ovum) —A most important rôle of the corpus luteum is the production of a specific hormone which sensitizes the mucous membrane of the uterus during the pregravid stage, so that it responds to the invasion of the fertilized ovum by the formation of maternal placental elements

The early hypertrophic endometrial changes in the menstrual cycle, up to the beginning of the secretory phase are initiated by the secretion from the follicle At this stage, the sensitizing hormone of the corpus luteum begins its activity with the preparation of the premenstrual or progestational phase of the uterine mucosa (premenstrual hypertrophy)

If fertilization ensues, the continued formation of this hormone by the corpus luteum governs the further development of the uterus throughout at least the early months of gestation

Without this sensitization, the ovum cannot take root Substantial support of this theory is found in the recent experiments of G W Corner and W M Allen (*Am J Physiol* 88:326 (Mar) 1929) These investigators removed the ovaries or corpora lutea in rabbits from 14 to 20 hours after mating The fertilized ova had then been in the tubes from 4 to 10 hours A total failure of progestational proliferation in the uterine mucosa resulted from this ablation Furthermore, none of the eggs which

were implanted survived beyond the fourth day, demonstrating the necessity of progestational proliferation for the implantation and early nutrition of the embryo

(b) Regulation and inhibition of follicular growth—The water soluble product in addition, inhibits the growth of the follicle, thus serving to regulate the periodicity of the menstrual cycle

The actual bleeding of menstruation, accordingly, takes place not because of the function of the corpus luteum, but because of the loss or withdrawal of its function. Amenorrhea, due to persistence of the corpus luteum without pregnancy, is possible theoretically

Wagner believes that the corpus luteum has a definite life span after which retrogression occurs followed by menstruation

A potent aqueous corpus luteum extract may, therefore, enable one to control too frequent and too prolonged menstruation in at least a temporary way

II A fat soluble anabolic hormone or "female sex hormone" According to Frank, in addition to the product of the menstrual corpus luteum, there are thousands of ova which do not fully mature, but undergo luteinization with the formation of miniature corpora lutea. These elaborate a certain amount of the follicle hormone or "female sex hormone" which exhibits a very specialized effect on the genital mucous membrane

Frank, Gustavson and Goldberger report that they have obtained both an active lipoid "female sex hormone" extract and an active aqueous Hisaw sensitizing hormone extract from the

same quantity of corpus luteum material

Corner has recently succeeded in preparing an active alcoholic extract of the corpora lutea of swine. This author proposes a test for measuring the activity of corpus luteum extract. A female rabbit is mated. Eighteen hours later, both ovaries are removed and a small section of the uterus is excised. The extract to be tested is then given for 5 days. The animal is killed, the embryos present are recovered, and the uterus is examined microscopically and compared with the small section removed at the time of castration.

A rabbit unit of the corpus luteum extract is defined as the minimum dose that suffices, when divided into 5 daily doses, to alter the uterus of a doe weighing from 3 to 4 kg ( $6\frac{1}{2}$  to 9 pounds), to a state similar to that of the uterus at the eighth day of normal pregnancy.

Corner has demonstrated that ovarian follicle fluid will not yield a positive result with this test.

**THERAPEUTICS**—It should be realized that sexual maturity does not result from the administration of the follicular or "female sex hormone." This hormone does not induce or stimulate ovarian function, but limits its action to the uterus, vagina and other accessory reproductive structures.

One must be cautious in appraising the value of the numerous commercial preparations of this hormone. A return of menstruation after a prolonged period of amenorrhea frequently occurs independent of any medication or treatment. According to Frank (*loc cit*), there appear to be only 2 substantiated and credible reports of the induction of menstrua-

tion. The first is the report of S Aschheim and B Zondek (Arch f Gynak. 130:1, 1927) who twice induced menstruation in a woman castrated 2 years previously. The second is the induction of menstruation in a castrated monkey by Pratt and Allen.

After injection, there is noted, however, a fulness and tingling of the breasts, pelvic fulness and an increase in the size of the uterus.

The failure to induce menstruation by the injection of follicular hormone is not surprising, since it can scarcely be expected that the cycle of the endometrium should be brought to a point beyond the function of the Graafian follicle, *i e*, to the beginning of the secretory phase. If menstrual hemorrhage does occur from a very large quantity injected, it is probably of follicular origin and produces the so-called "functional uterine bleeding."

Innumerable trade names are applied to supposedly active fractions of the internal secretion of the ovary, among them being "*ovarin*," "*folliculin*," "*corpus luteum*," "*placenta*," "*jeminin*," "*oestrin*," and "*sistomensin*."

Frank (*loc cit*) tested experimentally, the various commercial desiccated and unconcentrated ovarian preparations and found all of negative value. According to his investigations, no preparation of sex hormone is of value. The titrations are disappointing, and show that, even if the material left the manufacturer with the quantity of mouse units labelled, the rapid deterioration of the water soluble products destroys most of the activity. In this country *amniotin* and *estrogen* have been extensively used, but with unsatisfactory results. In Europe *menformon*

and *progynon* have proved equally disappointing. The outlook for the future, however, seems somewhat hopeful.

At the thirteenth International Congress of Physiology held in Boston in August, 1929, Doisy, Veler and Thayer (Am J Physiol 90 329 (Oct) 1929) announced for the first time the isolation of the female sex hormone in chemically pure crystalline form.

Butenandt (Deut med Wchnschr (Dec 27) 1929), of Gottingen, working independently, also succeeded in isolating the hormone in crystallized form. He pointed out, incidentally, that the substance is free from nitrogen and sulphur, and that it has no connection with protein substances and carbohydrates. In his opinion, a chemical analysis may make it possible to produce the hormone synthetically.

Both Doisy and Butenandt used the urine of pregnant women as the starting point in the isolation of the estrus principle.

Doisy states that assays of the crystals obtained after a large series of recrystallizations showed a potency of more than 2 million Doisy-Allen rat units per gram. If one terms "a mouse unit" the amount of hormone-containing substance sufficient to produce rutting phenomena in a castrated mouse, and 1 rat unit is equivalent to 4 mouse units, it is evident that in terms of mouse units the Doisy preparation is equal to more than 8 million mouse units per gram (15 grains).

Doisy has separated the crystallized hormone from urine, by using both olive oil and chloroform. From

diluted alcohol it crystallizes in colorless thin platelets

Butenandt's (*loc cit*) investigations were made with an oily extract of the urine of pregnant women. One gram of the oil, which was supplied for these experiments by a chemical manufacturer had the high potency of not less than 30,000 mouse units. By thorough purification, Butenandt was able to remove many substances associated with the hormone and to obtain a purified oil that possessed an astonishingly high potency. One gram (15 grains) of the oil served as a stimulant for 500,000 mice. By means of distillation in vacuo, the oil was further concentrated. When finally crystallized, the substance had a potency of 8 million mouse units per gram.

Butenandt reports that the crystals melt at a temperature of about 240° C. Their properties were confirmed in many hundreds of mice.

The pure glandular principle is not yet available commercially. The production of the concentrated product by these American and German investigators will doubtless expedite experimental work with the estrus hormone on an entirely new basis, particularly since both the chemical and the physiologic evidence points to the similarity between the active principle obtained by extraction from liquor folliculi and from the urine of pregnant women.

The theoretical knowledge thus far obtained of the dual secretion of the ovaries suggests, that by properly combining ovarian follicular hormone with an extract of corpora lutea, the normal cycle of events encountered in the uterus can perhaps be simulated. The former hormone, if em-

ployed during the first half of the menstrual cycle, should be effective in the proliferative phase, whereas, the latter extract should be useful in the second half of the cycle in inducing the secretory or glandular phase, with subsequent menstruation. In the treatment of amenorrhea, therefore, E. Novak (*Endocrinology* 11 173 (May-June) 1927) suggests the administration of *follicle extracts* over a long period of time, to be followed by the injection of a potent *corpus luteum extract*. Intensive research indicates that effective preparations will be available in the not far distant future.

**OXYGEN.**—P. Roth (*Anesth and Analg* 8 47 (Jan-Feb) 1929) states that lack of a sufficient supply of oxygen causes progressive damage to the central nervous system, heart and other organs. The injurious effects of anoxemia may soon become irreparable. Even though the cyanosis and respiratory and circulatory disturbances can be improved, the condition may terminate fatally if it is treated too late. Nerve tissue is the most easily damaged by insufficient oxygen. Cardiac muscle is more resistant. Three types of anoxemia are described: (1) The anoxic type, found in pulmonary conditions interfering with respiratory exchange in the lungs, such as pneumonia, severe bronchitis, asthma and emphysema, (2) the stagnant type, due to circulatory disturbances, especially of cardiac origin, and (3) the anemic type, due to the lessened capacity of the blood to carry oxygen caused by a low hemoglobin content, a low red cell count, or fixation of the hemoglobin by carbon monoxide.

The symptoms of anoxemia vary according to the suddenness and completeness with which the supply of oxygen to the tissues is cut off. The sudden cutting off of oxygen causes loss of consciousness, convulsions and death in a few minutes. A less sudden shutting off causes hyperpnea, a rapid and feeble pulse and impairment or loss of consciousness. In these

conditions, artificial respiration is indicated. When the deficiency in oxygen occurs gradually, the breathing is often of the periodic type, the mental faculties are impaired, and the patient suffers from nausea, vomiting, headache and diarrhea.

Oxygen can be administered by means of a rubber balloon, nasal tube, mask, bed tent, or oxygen therapy chamber.

In the induction of anesthesia, safety depends in large measure upon the prevention of anoxemia or asphyxia by the timely use of oxygen and carbon dioxide.

**THERAPEUTICS**—J. H. Evans (M. J. and Rec. 127:349 (Apr. 4) 1928) discusses the use of oxygen in 14 cases of **pneumonia** in which from 60 to 100 per cent oxygen was given continuously for periods of from 4 to 15 days. In no instances did such high concentrations act as an irritant or produce any harmful results, because pneumonia patients require more than the usual amount of oxygen in the inhaled air to bring the blood oxygen up to normal. To be effective it should be commenced early. Its beneficial use is indicated in various other diseases such as **asthma**, **bronchitis**, **arthritis**, **burns** and **cardiac cases**.

H. G. Irvine and D. D. Turnacliffe (Arch. Dermat. and Syph. 19:270 (Feb.) 1929) assert that liquid oxygen offers a practically sure, quick and painless method for the removal of all types of **warts**, including the plantar type. It can be used more quickly and less painfully than the electric needle in the removal of pigmented, hairy and papillomatous **nevi**. It is to be considered of value as a destructive agent in treating **seborrhoeic keratoses**, **lupus vulgaris**, **tuberculosis of the skin**, and small **epitheliomas**. The cosmetic results following its use as a destructive agent are excellent.

**SUBCUTANEOUS INJECTIONS**—V. Mikulowski (Arch. de med. d. enf. 32:73 (Feb.) 1929) emphasizes the good results of the subcutaneous injection of oxygen in children's diseases in which there is deficient oxygenation caused by circulatory or respiratory disturbances and in infectious diseases. He reports several cases of **croup with pneumonia**, of **typhoid fever** and of **carbon monoxide poisoning** in which he observed a rapid amelioration of the

cyanosis, restlessness and hypotonia after the subcutaneous administration of oxygen (about 100 cc (3½ ounces) per dose). However, he used the oxygen as medication complementary to various other treatments appropriate to each peculiar disease.

T. S. Kirk (Brit. M. J. 2:195 (Aug. 4) 1928) explains the use of subcutaneous injections of oxygen. Several cases of **acute lobar pneumonia** have been treated by the writer with subcutaneous injections of oxygen immediately on admission to the hospital, with uniformly good results. The crisis comes on very rapidly. In a case of **pneumonia complicating glossitis**, a **post-anesthetic pneumonia**, and a case in a man with a **bad fracture of the pelvis**, the results have all been good.

Given subcutaneously, oxygen certainly does not produce any lung trouble or aggravate it if it exists, as may be the case when inhaled, even if heated. Although Kirk has given it in at least 200 cases, not a single local or general bad effect has been seen, so that it may be considered a perfectly safe procedure. Subcutaneous injections of oxygen, besides being of great use in cases of **pneumonia**, are of value in all cases of **anoxemia**, and these are numerous and serious. **Chloroform** or **post-anesthetic sickness** is due to acidosis, and all of Kirk's patients, before being removed from the operating table, are given a dose of oxygen, with the result that sickness is much diminished, since January only 1 patient out of 200 has developed any post-anesthetic pneumonia.

A striking effect of subcutaneous oxygen is seen in connection with extensive **burns** and **scalds** of the body in which a severe acidosis develops. Of all those with burns and scalds of the trunk treated with oxygen, only 1 patient has died, but this patient was not admitted till the third day, when the temperature was raised, the pulse rapid, and acidosis well established. Three patients with similar symptoms admitted a few hours after the accident, were given oxygen at once, and all did well, at most their urine showed a slight and temporary acidosis. The amount of oxygen given was largely determined by the amount of acid in the urine. Kirk injects from 200 to 400 cc, repeating the dose in 6 hours if most of it has been absorbed. A large dose of

oxygen can be given as easily and quickly as a dose of serum, and it is less painful

**OXYURIS.**—K J Skriabine and R E S Schultz (Profilak med 7 22 (June-July) 1928) in an article on the subject of oxyuris vermicularis in children classify the normal localizations where the oxyuris are usually found. These are the distal portion of the small intestine, the cecum and appendix. In these locations, the parasites become mature and both sexes may be identified. In the lower part of the rectum only the female may be found, where it comes apparently to deposit eggs. *Enemata* are useful in eliminating the female from the rectum although this form of therapy is inadequate in reaching the normal localizations of the parasites. H Chiari (Virchow's Arch f path Anat 269 730, 1928) in an interesting article reviews the *complications* of

oxyuriasis. These worms have been found in the intestine and also in the female genital organs, including the Fallopian tubes, which condition indicates that they are not innocuous parasites. However, to date it has not been possible to prove that these worms may cause, in themselves, inflammatory changes. Chiari reports the case of a woman 20 years of age, suffering from lymphangitis of the right lower abdominal quadrant. At operation, the fallopian tube was found to contain a female oxyurid with numerous ova and a large number of mature ova in its vicinity. The parasite lay partly in the lumen of a crypt and partly in the mucous fold of the tube. Inflammatory exudates in the tube consisted mainly of eosinophilic leukocytes. Chiari maintains that there was no definite proof that the worm had any etiologic association with the inflammation.

## P

**PANCREAS.—ACUTE HEMORRHAGIC PANCREATITIS**—According to S Okada, K Kuramochi, T Tsukahara and F Ooinoue (Arch Int Med 43 446 (Apr) 1929) pancreatic secretion is stimulated by subcutaneous injection of aqueous liver extract or insulin and by hypoglycemia and is inhibited by epinephrin and hyperglycemia.

**DIAGNOSIS**—In 12 cases of acute hemorrhagic pancreatitis produced experimentally in dogs, L Binet, P Brocq and G Ungar (Presse med 37 848 (June 29) 1929) noted a characteristic humoral syndrome consisting of cytologic and biochemical blood changes. Leukocytosis and polycy-

themia were present early, later the number of erythrocytes decreased. Glycemia was normal and the blood chlorides sometimes increased. The characteristic biochemical change in the blood is the increase of total fat and cholesterol content which, in the presence of milky appearing blood serum, indicates fat necrosis and is a very important diagnostic sign. These changes usually disappear in 2 or 3 days.

Although the symptomatology is vague, one important feature is persistent bilious vomiting not becoming fecal, according to P Muller (Bull Acad de méd, Paris 97 819 (June 21) 1927). This, however, is a late

symptom and operation should not be delayed in waiting for it

**TREATMENT**—The use of tampons in operations for injuries to the pancreas, is to be avoided, according to Volkmann (*Arch f klin Chir* 153. 677 (Dec 23) 1928), because of the tendency to the formation of fistulæ, adhesions, and cysts. Through-and-through sutures with thin silk and peritonealization are necessary, but drainage is not. The mortality in 32 such cases was 3 12 per cent. A case of complete division through the neck of the pancreas due to trauma was operated by A. Newton (*Surg Gynec Obst* 48 808 (June) 1929). The lesser peritoneum contained blood and there were 2 patches of fat necrosis near the foramen of Winslow. Repair was effected by suturing the torn gland and attaching a 2-inch wide strip of omentum to encircle it covering the line of anastomosis. A month later the abdomen was again opened for a cyst of the lesser sac containing 2 pints of clear fluid. Palpation revealed good union of the pancreatic anastomosis. The cyst walls were sutured to the parietal peritoneum around a drainage tube. Convalescence was uneventful and the patient is symptom-free.

Drainage is indicated, in the opinion of P. Muller (*Bull Acad de méd* 97 819 (June 21) 1927), only when there is a collection around the pancreas, a peritoneal exudate or unevenness or softening of the gland, indicating purulent foci. If operation is early, the cause for duodenal stasis removed, and the pancreas free of the above lesions, drainage is unnecessary. He reports the case of a woman, aged 50 years, who was seized with abdominal pain of increasing severity, nausea,

persistent vomiting, and a sensation of coldness. At operation, fat necrosis was found widely disseminated over the omentum and a tense, thick band of omentum stretched between the 2 hypochondriac regions was obstructing the intestinal loops and pressing upon the pancreas. The pancreas was hard and enlarged, but had an even surface and was free of foci or softening. Biliary disease was found. The obstructing band was severed, the abdomen closed without drainage and ice was applied. After violent delirium for 3 days, the patient completely recovered.

Drainage of the common bile duct is indicated in the presence of occlusion of the ampulla of Vater, cholecystitis, cholelithiasis, or the aspiration of turbid bile from the duct. H. Coenen (*Zentralbl f Chir* 55 900 (Apr 14) 1928) feels its value is problematic when the acute necrosis of the pancreas is due to other causes, such as activation of its secretion by perforation of a gastric ulcer into the pancreas or when it is caused by a hematogenous infection, an embolism, or trauma. Of 6 cases of acute pancreatic necrosis, 4 recovered following incision of the pancreas and drainage alone. These are the essential features of the operation and common duct drainage should not be a routine procedure.

A case of pancreatic fistula occurring after gastric resection and gastrojejunostomy for ulcer is reported by J. Madier (*Bull et mém Soc nat. de chir* 55 570 (May 4) 1929). Seven months after operation he transplanted the pancreatic duct into the efferent branch of the jejunum. After a difficult convalescence of 2 months, with high temperature and the extrusion



of necrotic tissues from the abdominal wound, the patient completely recovered and has enjoyed good health for 3 years

**CYSTS**—From a series of 47 cases occurring at the Mayo Clinic since 1921, H Mattson (Proc Staff Meet Mayo Clin vol v, No 15) makes the following summary. Although the duration of the symptoms varied from 2 weeks to 20 years, the majority gave a history of less than a year. Disease of other organs was found in 19, cholelithiasis in 13, cholecystitis only in 3. Forty-three patients complained of pain, though this may have been due to associated cholecystitis or pancreatitis. In 28 cases of this series cyst of the pancreas only was found. Pain was present in 24, in 13 of which it occurred in acute attacks, in 11 it was more or less constant, and loss of weight and weakness were the most common symptoms, varying from 4 to 60 pounds. Nausea and vomiting were common, in 10 there was a definite history of jaundice and in 3 others this history was doubtful. Disease of the gall-bladder was noted in 6 of these 13, diarrhea occurred in only 3 cases. Most important in the recognition of cysts is a smooth, relatively immobile swelling with tense walls, most frequently occurring in the upper abdomen in or slightly to the left of the median line. In 23 cases the mass was to the left, in 11 approximately in the midline and in 13 in the right upper abdomen. In 11 cases the cyst was movable, in 9 of which they originated in the tail of the gland. In 7 cases the cysts were excised completely, the majority from 6 to 10 cm in diameter, one 20 cm. Thirty-three cysts were drained in one stage, 6 partially excised and

drained, and in one case exploration only was done. The risk and ultimate outcome seemed to be the same for excision and drainage. No fistula drained more than 2 years.

The case is reported by Bérard and Cade (*J de méd de Lyon* 9.459 (Aug 20) 1928) of a young man aged 17 years, with a pancreatic pseudocyst. The large mass under the left costal margin had appeared several months previously but had spontaneously disappeared after several days to gradually recur. Under observation, the mass underwent a diminution of more than one-half of its volume in 1 day. Palpation revealed the remaining rounded mass.

At operation a typical pseudocyst was tapped and its edges sutured to the abdominal incision. The fluid contained both lipolytic and amylolytic ferments. The only possible explanation of the striking variation in the size of this pseudocyst is the spontaneous evacuation through the ducts of the gland. This probably occurs when a certain pressure is reached.

J B A Touw and W A Boekelmann (*Geneesk bl u klin en lab v. d prakt* 26 271, 1928) divide pancreatic cysts into true cysts, pseudocysts and hydatid cysts. The true cysts include retention cysts, cysto-epitheliomata with proliferation of the epithelium of the acini or excretory ducts, and the rare congenital cysts. Pseudocysts are often formed by softening in fat necrosis or tumors, by autodigestion after trauma, and by the escape of blood and pancreatic juice into the omental bursa. They are usually of traumatic origin. Hydatid cysts are rare as the pancreas is involved in only 1 per cent of cases of echinococcus infection.

The causes of cysts are (1) chronic and acute inflammations following gastroduodenal catarrh, bile-tract disease, the perforation of gastric and duodenal ulcers into the pancreas with subsequent occlusion of the excretory duct, (2) trauma, (3) neoplasms and (4) the echinococcus.

The pathogenesis of the cysts is not entirely clear. Pure retention cysts have never been observed nor produced experimentally. As a rule, epithelium is absent. The retained secretion destroys the walls and the latter are replaced by inflammatory tissue. Small cysts become confluent as, for example, in chronic pancreatitis. Traumatic cysts usually arise within 3 months after the injury, usually a blunt trauma to the upper abdomen. Many of the cysts are encapsulated blood extravasations in the omental bursa, but according to Koerte, true cysts may also be caused by trauma followed by chronic interstitial pancreatitis, leading to occlusion of the excretory duct. Obstructed excretion and obstructed absorption work together. Lazarus confirmed this view by experiments.

Honigsmann, on the basis of his autopsy protocols, classified pancreatic cysts into the following groups: (1) the peripancreatic, those formed in the omental bursa, (2) the parapancreatic, those formed under the peritoneal covering of the gland, and (3) the endopancreatic, those formed within the gland substance. He never found an endothelial or epithelial lining of the inner wall. Cysts formed by softening in necrotic areas were also observed by him.

Pathologic-anatomical studies of cysts removed by operation are rare since, as a rule, the cyst is sewed into

the wound in the abdominal wall. Biopsies of the cyst walls reveal varying pictures. At autopsy, glands with multiple small cysts are repeatedly found. These may arise from any portion of the gland. Large cysts appear most frequently in the body or the tail of the organ. The large cysts, which are usually broad based and rarely pedicled, may contain as much as 26 liters (quarts) of fluid. The rapidity of growth is variable. As a rule, the wall is smoothly covered with peritoneum. Internally, the cysts are smooth walled and often multilocular. Metastatic epitheliomata occur. Usually the epithelium of the inner surface is destroyed. The contents are light or dark in color, depending on the amount of blood pigment present. Blood does not prove that a cyst is of traumatic origin. The consistency of the cyst contents is variable, but is usually mucoid. In about a third of the cases the cysts contain pancreatic ferments, most often the diastatic, next most often the lipolytic, and least often the tryptic. The contained blood seems often to check the activity of the ferments.

W. A. Boekelmann reports 11 personal cases. He states that the cysts occur with equal frequency in both sexes. Trauma seems to be the cause in only 30 per cent. The history is not characteristic. Except in cases of trauma, it points to the underlying disease which gave rise to the chronic pancreatitis. Pain is present, and often is associated with attacks of vomiting. Dyspeptic symptoms and loss of weight are common. Fever is rare. The *Loewi test* (dilatation of the pupils after the instillation of adrenalin into the conjunctival sac) is unreliable for diagnosis. *Ferment*

*tests* in the stools, serum, and urine, which should indicate pancreatic function, are of limited value

The clinical findings are important. Lazarus divides the cases into the following 5 types

1 The *gastrohepatic* type, in which the cysts develop between the liver and the lesser curvature of the stomach. This type is rare

2 The *retroventricular* type

3 The *gastrocolic* type, in which the cyst forms in the omental bursa. This is the most common type

4 The *mesocolic* type, in which the cyst develops in the transverse mesocolon and is easily mistaken for an ovarian cyst

5 The *prevertebral* type, in which the cyst develops from the head of the gland in front of the spinal column and extends downward

**DIAGNOSIS**—X-ray examination, with inflation of the colon and a contrast meal in the stomach, often gives good pictures. Sometimes inflation of the stomach and colon will suffice. The most common location of the cyst is in the epigastrium or the left hypochondrium. The demonstration of fluctuation is important but is not always possible. Pancreatic cysts have been confused with renal, adrenal and hydronephrotic tumors. Ureteral catheterization may be misleading because of pressure of the tumor on the ureter. Retroperitoneal malignant tumors may simulate a pancreatic cyst. Once an aneurysm of the abdominal aorta was mistaken for a cyst of the pancreas. In 5 cases reported in the literature, a pancreatic cyst was diagnosed as an ovarian cyst, although pancreatic cysts usually leave the iliac fossa free. In the differential diagnosis it is

necessary to rule out also echinococcus cyst of the left lobe of the liver. Cysts of the mesentery and omentum are much more mobile than cysts of the pancreas. Exploratory puncture is dangerous

The **PROGNOSIS** without operation is unfavorable

**TREATMENT**—According to Muller, a cure is obtained by total excision in 64 per cent of the cases, by partial excision in 78 per cent and by incision with drainage in 90 per cent. Total extirpation is indicated particularly for carcinoma and cystadenomata. When drainage is established a fistula not infrequently persists. The *fistula* may be treated by diet (carbohydrate-free, Wohlgemuth), radium irradiation, or extirpation or implantation of the fistulous tract into the stomach. Drainage may be followed also by suppuration of the cyst. The author observed a fistula after drainage which communicated with the bowel by way of the pancreatic duct. Regulation of the diet brought about recovery. In the case of a man aged 29 years, the author saw the development of severe diabetes as a late result

**CALCULUS—DIAGNOSIS**—Pancreatic lithiasis is comparatively rare, only 103 cases having been recorded. A patient who complained of indefinite abdominal symptoms such as a feeling of pressure and flatulence is reported by A. W. Meyer (Zentralbl f Chir 55 2440 (Sept 22) 1928). There was no colic and the stools contained much fat. Bowel movements or the passage of flatus were accompanied by an oily yellow fluid. The x-rays disclosed a pancreatic stone about 6 cm long and shaped like a scimitar. The patient made an

uneventful recovery from operation and is free of symptoms

S J Seeger (Radiolog 10.126 (Feb) 1928) reports a case successfully operated upon. From the literature on 26 other cases proven at operation, he concludes that pain is the most important symptom. It is usually epigastric and may be dull, continued, or intermittent, or occur in colics resembling cholelithiasis. Radiation to the left is rare but characteristic. Glycosuria is late and due to intralobular pancreatitis. Pre-operative diagnosis was accurate in only 2 of the 26 cases. X-ray findings are variable, although stone shadows were disclosed in several of these cases. Kirkland had seen 2 at the Mayo Clinic and 5 at Battle Creek in which x-ray evidence was conclusive.

In a case of multiple pancreatic calculi cited by E C Lindsay (Lancet 1 700 (Apr 7) 1928) the pain began mildly as an ache in the epigastrium, from a half to one hour after food, and culminated in severe colic with sweating, but no vomiting. The pain then radiated to the left side of the abdomen, as has been noted in other pancreatic disturbances, such as subacute pancreatitis and gastric ulcers penetrating into the pancreas. At operation, a string of soft stones in the main pancreatic duct, grit in the lesser ducts, and fibrotic pancreatitis suggested a catarrhal origin, due to ascending infection from the duodenum. The stones were mainly calcium carbonate with a small admixture of phosphate. The diagnosis in this case was made preoperatively and at operation tube drainage was instituted in the pancreatic duct and the gall-bladder. Previously this patient

had had drainage of a cyst of the lesser peritoneum

**TUMORS —ADENOMA**—In a case reported by W U McClenahan and G W Norris (Am J M Sc 177 93 (Jan) 1929), there were periodic attacks of hypoglycemia associated with loss of memory and consciousness and vaguely defined "queer feelings" relieved by ingestion of food. At autopsy a large adenoma, wholly composed of island cells and marked hypertrophy of the islands in the remainder of the pancreas, were disclosed. There was also extensive bronchopneumonia and generalized arteriosclerosis. The significance of the relationship between hypoglycemia and such hypertrophy or adenoma would seem to add further evidence toward the creation of a new disease entity.

In 5 cases of hypoglycemia in non-diabetic patients reported by Harris, the cardinal symptom was weakness, especially noted before the noon meal, which was relieved by frequent feedings, during the fasting state the blood sugar averaged 60 mgm per 100 c c.

In a review of the literature on adenoma of the pancreas up to 1926, Warren found reports of 20 cases, in none of which were any symptoms demonstrable. Hyperplasia of the surrounding islands was present in 5. It is questionable whether hyperplasia of the islands is the cause or effect of, the increased carbohydrate intake. Small adenomata have occurred in diabetics. Pancreatic adenoma shows similarity to adenoma of the pituitary and thyroid, each of which may cause hypersecretion.

W Thalhimer and F D Murphy (J A M A. 91 89 (July 14) 1928)

reported a case of tumor, either low grade malignancy or adenoma in a woman aged 57. For 2½ years she had severe attacks of somnolence followed by great restlessness and irritability. Attacks lasted about one day and were accompanied by epileptiform convulsions. The frequency had increased from 3 times a week to daily. In the hospital, seizures occurred regularly about 9 a.m. and lasted for 30 to 60 minutes. Two blood sugar determinations were 60.6 and 33.5 mgm. The patient lived only 1 month. Autopsy revealed a tumor 1½ by 1 cm. near the tail of the pancreas and microscopically resembling islands of Langerhans. The cause of death was *hyperinsulinism*.

A case is reported by K. Semsroth (Arch. Path. 6: 575 (Oct.) 1928) of a growth in the head of the pancreas interpreted as an incomplete insulo-acinar transformation of a primary pancreatic nodule. Adenomas and adenomyomas of the intestinal gland type were found in the muscular coat of the duodenum and a carcinoid in the sub-mucous coat. There was no evidence of malignancy. These were apparently due to faulty differentiation of the entoderm. The carcinoid was considered a dysontogenetic heterotopy.

**CANCER**—*Diagnosis*—It should be possible to make a fairly definite diagnosis of certain carcinomata of the body of the pancreas without exploratory incision in the opinion of C. U. Collins (Illinois M. J. 55: 366 (May) 1929). If a male patient between 40 and 60 years of age suffers continuous pain and discomfort in the upper abdomen, particularly if the pain radiates to the left side posteriorly and is *made worse by lying flat on the back*, is

losing flesh progressively, and an x-ray examination of the gastric and intestinal tract reveals nothing abnormal, a diagnosis of carcinoma of the body of the pancreas is probably correct. It should not require the subjugation of the patient to the danger and discomfort of an exploratory operation. Two such cases proven at operation, are reported. A third case of stone in the common duct of 20 months' duration, causing painless, progressive jaundice, and simulating carcinoma of the head of the pancreas, is cited. Recovery followed operation.

The importance of compression signs in the diagnosis of cancer of the pancreas in its 3 locations is stressed by M. Roch (Rev. med. de la Suisse Rom. 49: 326 (May 25) 1929). Cancer of the *head* of the pancreas, comprising 75 to 80 per cent. of cases, is characterized by the pancreaticobiliary syndrome of icterus with acholic stools, rapid cachexia, extreme distention of the gall-bladder and epigastric pain without enlargement of the liver or spleen or the presence of ascites. These result from compression of the common bile duct. In rare cases, this compression does not occur and a pancreaticoduodenal or pyloric syndrome simulating cancer of the alimentary tract results. This can be differentiated by the presence of achlorhydria, occult or gross hemorrhage and by radiology.

Cancer of the *body* is characterized by the pancreaticosolar syndrome. This consists of epigastralgiæ with intense exacerbation and varied radiation, by gastric intolerance, and the presence of Einhorn's sign—*increase of pain in the dorsal decubitus due to pressure on the retropancreatic solar plexus*. This phase may be confused

with tabes or gastric ulcer and is differentiated by cachexia, the absence of other signs of tabes, and the results of x-ray and gastric analysis. These tumors may compress the aorta, presenting a pulsatile mass felt in, or a little to the left of, the midline and simulating abdominal aneurysm. The absence of expansile pulsation and of retardation of the femoral pulse, the duration of the tumor, a negative Wassermann and the presence of rapid cachexia, indicate malignancy.

Cancer of the *tail* is indicated by the pancreaticogastric syndrome consisting of gastric pain, dyspepsia and vomiting and a characteristic notch on the greater curvature of the stomach, revealed by x-ray.

On the basis of 37 cases and comparison with other cases in the literature, J. Friedenwald and T. S. Cullen (Am J M Sc 176 31 (July) 1928) summarize carcinoma of the pancreas. This is the most common malignant tumor of the pancreas. It occurs usually between the fortieth and seventieth years and in 300 cases males were affected almost twice as often as females. The primary type most frequently originates in the head, is usually scirrhous and characterized by enlargement with nodulation. Direct extension and metastases occur. Compression of the duct of Wirsung induces an interlobular pancreatitis, destroying the islands of Langerhans. When far advanced, this causes intermittent or permanent glycosuria. The onset is usually gradual and vague. Mild symptoms of indigestion soon increase to pain, vomiting, jaundice and cachexia. Pain is very characteristic in most cases, is progressive and may be intermittent, suggesting biliary colic. Tenderness of the epi-

gastrium and right costal arch is frequent. Jaundice is common and may be the first symptom, increasing to an olive green and finally a black hue. In this stage enteric hemorrhage is not unusual. Gastric analysis frequently shows free hydrochloric acid, the stools are usually acholic and contain an abnormal amount of fat and undigested meat fibers. A diminished activity of the pancreatic secretion, enlargement of the liver, and a pear-shaped distention of the gall-bladder are important. In the late stages a palpable tumor and evidence of pressure on other organs causing ascites, edema of the extremities and obstruction are often present. About half the cases are typical and easily diagnosed. In others it is often extremely difficult and the differentiation between chronic pancreatitis and malignancy of the pancreas is at times impossible, even at operation. The duration varies from a few months to 4 years, depending on the type, location and extension of the tumor. Cholecystostomy, cholecystogastrostomy and gastrocystenterostomy are frequent palliative procedures.

A case of metastatic carcinoma of the pancreas is cited by Esau (Arch f klin Chir 153 826 (Dec 23) 1929). The primary tumor produced no symptoms and was discovered at autopsy. The metastasis in the pancreas grew rapidly, producing early icterus, involving the duodenum and causing severe intestinal hemorrhages, and finally occluding the pylorus. There were 3 metastatic nodules in the liver.

Four cases of cancer of the ampulla of Vater were reported by J. Llambias, D. Brachetta Brian and G. Orosco (Semana méd 2 649 (Sept 13) 1928). Jaundice, the cardinal symptom, usu-

ally developed early, the tumor was generally small and protruded into the lumen of the duodenum. It involved the muscle tunic of the duodenum in 1 and the pancreas in 2 cases. Extension into the neighboring organs is common. Metastases are rare, probably because bile retention causes early death. The diagnosis is usually confused with ulcer, lithiasis, or cancer of the head of the pancreas or bile ducts. These neoplasms were of a cylindrical type. They may or may not be purely acinous. The palliative treatment is surgical.

A further case of carcinoma of the pancreas is reported by G. Howland, W. R. Campbell, E. J. Mallby and W. L. Robinson (J. A. M. A. 93: 674 (Aug. 31) 1929). Preoperative diagnosis of tumor of the pancreas was made. The tumor was removed and the patient relieved of symptoms up to the time of the report, 3½ months after operation. This constitutes the first successful treatment of such a case in the literature. The symptoms of dysinsulinism of 6 years' duration, were attacks of coma and convulsions increasing in frequency, warded off by the administration of food, and due to low blood sugar levels. There was an erratic response to carbohydrate administration. The tumor was a slow growing carcinoma of the islands of Langerhans from which insulin was recovered. No metastases were found at operation.

J. M. T. Finney and J. M. T. Finney, Jr. (Ann. Surg. 88: 584 (Sept.) 1928) report a case of persistent marked hypoglycemia associated with attacks suggesting insulin shock or hysteria. A massive resection of the pancreas was done to reduce the out-

put of the islands of Langerhans. The resulting improvement indicates that the removal of a large portion of the pancreas is comparatively safe.

### PARATHYROID GLANDS.—

It has long been known that parathyroid function has an influence upon calcium metabolism. The priority for the extraction of a potent preparation relieving the tetany of parathyroid deficiency should go to A. M. Hanson (Mil. Surgeon 54: 76 (Jan.) 1924), a practicing physician working under great difficulties. Shortly thereafter, J. B. Collip (J. Biol. Chem. 63: 395 (Mar.) 1925) also obtained an effective extract and gave therewith a clean cut demonstration that calcium metabolism and parathyroid function are related. Collip showed that parathyroid extract not only relieves the *tetania parathyreopriva*, but also brings about an increase in the blood calcium which occurs in this condition. Whether or not the tetany of parathyroid deficiency is due to a guanidine poisoning as first postulated by Paton and Findlay is a question not yet solved.

The conclusion that the tetany is solely due to calcium deficiency is somewhat vitiated by the fact that tetany can be prevented and the blood calcium still remain at low levels when cod-liver oil is fed to the parathyroidless animals. Consistent with this is the recent observation that the administration of vitamin D simultaneously with parathyroid extract, enhances the reaction to the latter. Thyroparathyroidectomized animals have been carried through estrus, pregnancy and lactation by the addition of cod-liver oil to the stock diet.

In the case of rats even this precaution was unnecessary

In conditions of *parathyroid insufficiency* certain physiological changes have been established J C Brougher (N. W. Med 27 329 (July) 1928) found that blood coagulation time was delayed Some animals showed only slight delay while the blood of 1 in severe tetany did not clot for 30 hours One ounce (30 cc) of cod-liver oil or 0.4 cc (7 minims) of **aceterol** was efficacious in restoring normal coagulation time after a period of 2 to 4 hours Animals receiving these adjuvants for 20 to 30 days recovered, and in this recovery the coagulation time returned to normal

Parathyroid deficiency when accompanied with tetany produces marked congestion of the viscera with necrosis In parathyroidectomized rabbits dye excretion by the liver is depressed, while the output of foreign proteins is increased The glands therefore have an important influence on liver excretion and on assimilation of foreign proteins Colectomy apparently has some influence on the appearance of tetany in parathyroidless dogs When the operation precedes the removal of the parathyroids the onset of tetany is modified in the direction of delay When colectomy succeeds parathyroidectomy only a transitory depression of the tetany is obtained These shifts are accompanied by a slight transitory increase in the serum calcium

Studies have been made of what happens to bone regeneration when "*parathormone*," the technical name of the active principle of the gland, is given It was found in young dogs that new bone formation was distinctly better in the animals not re-

ceiving the extract In adult dogs no essential differences were exhibited It would seem as if the increased blood calcium which obtains when the extract is given comes from tissues and ultimately from the bones The use of parathyroid extract would then be contraindicated in the bone disorders

From many clinical studies of the therapeutic use of the extract it appears that although the product is biologically standardized and promptly beneficial in **acute tetany**, where daily injections are necessary for many months, recovery is seriously impaired by an increasing immunity toward the product gradually acquired by the patient This may be due to an <sup>1</sup>/<sub>10</sub> increased tolerance for its protein content Intercurrent infections in **chronic tetany** demand augmented **hormone** dosage

Turning now to the condition of *hyperparathyroidism* which is beginning to be recognized clinically in greater degree since the development of the physiological knowledge with reference to calcium metabolism, significant features are present, according to D P Barr, H A Bulger and H H Dixon (J A M A 92 951 (Mar 23) 1929) They are hypercalcemia, increased calcium in the urine, muscular hypotension and weakness, multiple cystic bone tumors and formation of calcium stones These conclusions have been substantiated by J D Boyd, J E Milgram and G Stearns (J A M A 93 685 (Aug 31) 1929) with the following additions Polyuria is not infrequent and a heavy urinary precipitate accompanies an alkaline urine No confusion with renal rickets is possible if a serum analysis is had, for in



this disease calcium is low and phosphorus high, while in hyperparathyroidism calcium is high and phosphorus low. All patients have difficulties in locomotion. The most constant change in the bones as shown by x-rays is rarefaction. A negative calcium balance obtains. Comment is made on the fact that giant cell tumors have been diagnosed in the bones in numerous instances of probable hyperparathyroidism. On the other hand, until it can be demonstrated that malignant conditions can of themselves, without parathyroid involvement, produce disturbances of the calcium metabolism such as these observers find, it is probably justifiable to consider such associated microscopic changes as secondary to the parathyroid dysfunction rather than as neoplastic in origin.

According to R. M. Wilder (Endocrinology 13:231 (May-June) 1929), the onset of the disease is insidious and the course chronic and progressive. The early symptoms are weakness and pain in the bones. The bones soften and the skeleton undergoes more or less deformity, such as wedge-shaped pelvis, scoliosis, and loss of stature. Fractures may occur. Multiple swellings of the bone may occur and renal calculi. Secondary anemia is present. Chemical analysis of the bones shows considerable loss of calcium and phosphorus, and a relative, if not an absolute, gain in organic matter. The skeletal lesion is that described by von Recklinghausen as *osteitis fibrosa*, for which Stenholm has proposed the more appropriate term *osteodystrophia fibrosa*. The disease is the antithesis of tetany. It usually occurs in association with a tumor of the parathyroids,

though exceptions are noted. To some extent at least the disease is successfully combated by treatment with ultra-violet light and a diet rich in vitamin D. Removal of the parathyroid tumor is reported to be followed by marked improvement in strength and muscle tone, relief of pain in the bones, increased calcification of the bones, and disappearance of the tumor.

Finally, it has been found by W. L. A. Wellbrock (J. A. M. A. 92:1821 (June 1) 1929) that the occurrence of *accessory parathyroid glands* in human material is fairly frequent. He examined 1056 thyroids immediately after their removal at the Mayo Clinic. Accessory glands were situated on the anterior surface, the isthmus, or the lateral surface, or embedded in the thyroid tissue just within the border of the larger structure. One or more accessory parathyroid glands were found in 7.76 per cent of the organs examined as checked by histologic study. They vary from 2 to 10 mm in size and may be pear-shaped, lenticular, or spheroidal. They are yellowish-brown in color, soft, and finely granular. They may be confused with accessory thyroid bits, hemolymph glands, nodes, or fat lobules. Accessory parathyroids were found equally on exophthalmic, adenomatous, and colloid thyroids.

**PARATYPHOID FEVER.**—D. Herderschee (Nederl. Tijdschr. v. Geneesk. 1:132 (Jan. 12) 1929) records his observation on 120 cases admitted to the hospital from 1918 to 1926. During this period, 1560 cases of typhoid were admitted. The proportion of children affected was con-

siderably higher than in typhoid fever, 37 being below the age of 10 and 83 above. This compares with 303 below 10 and 1257 above in the case of typhoid. Only 1 of the paratyphoid patients died—death being due to bronchopneumonia following appendicitis in convalescence—as compared with a mortality of 15.4 per cent in the typhoid patients. No instance of perforation or peritonitis occurred among the cases of paratyphoid and only 1 of intestinal hemorrhage, whereas perforative peritonitis was noted in 21 per cent of the typhoid cases and intestinal hemorrhage in 8.6 per cent. Relapses occurred in only 1 instance in the paratyphoid, while it was present in 11 per cent of the typhoid patients. There was no difference as regards the incidence of the other symptoms.

A. Graham-Stewart, P. Manson-Bahr and T. R. Goddard (Brit. M. J. 1, 934 (June 2) 1928) report an epidemic of paratyphoid in which the inoculation period was from 10 to 24 days. The onset was with a transient headache, a high temperature and relative slow pulse. By the fifth day, rose spots were visible and a positive agglutination for *paratyphosus B* was obtained and blood cultures were positive. An Italian cream cheese was regarded as being the possible source of the outbreak and carriers were searched for but not found.

**PARESIS.—PATHOLOGY**—R. R. Dieterle (Am. J. Psychiat. 7, 547 (Jan.) 1928) found spirochetes in 25 per cent of 12 brains. They were located principally in the cortex and to a lesser extent in other ganglionic areas, with none in the white matter.

R. B. Wilson (Brain 51, 440 (Dec.)

1928) reports the study of 16 cases of general paralysis all of whom died within 6 weeks after malarial treatment. The outstanding findings were the strong glial proliferation and the richness of iron in the walls of the blood-vessels, the iron indicating increased permeability of the blood-vessels. A disappearance of the lymphocytic element around the capillaries was also noted. In only 1 case were spirochetes found.

Of cases which came to necropsy from 6 months to 2½ years after malarial treatment, 6 showed scattered foci of acute inflammatory changes with mesodermal elements, and 5 showed spirochetes.

W. L. Brutsch and Max A. Bahr (J. Nerv. and Ment. Dis. 67, 209 (Mar.) 1928) studied the influence of malarial inoculation on the histologic changes in general paresis and conclude that the benefit derived from malaria depends upon the disappearance of the perivascular infiltration and the general re-establishment of normal relations between the ectodermic and mesodermic elements. A. Ferraro (Arch. Neurol. and Psychiat. 21, 69 (Jan.) 1929) from the examination of 29 brains of malaria-treated patients gives similar results and stresses the parallelism of recovery in cases in which there was a disappearance of the pathological neuroglial elements.

Forster (Arch. f. Psychiat. vol. lxxvii, 1929) made brain punctures in 59 patients and found spirochetes in 37 of them.

**TREATMENT**—The treatment of paresis has not undergone any radical changes in the past 2 years. The principal agents employed are **tryparamide** and the various forms of **fever**

treatment of which malaria is most widely in use

Henry A Bunker, Jr (Am J Psychiat 8 681 (Jan) 1929) states that of 542 tryparsamide cases collected from the literature, full remission of mental symptoms and restoration of the patient to approximately his former status occurred in about 35 per cent. About 30 injections of tryparsamide generally produced the maximum clinical improvement of which the drug was capable, but upwards of 100 injections were often necessary to modify materially the strength of the Wassermann reaction in spinal fluid.

G H Stevenson (Canad M A J 17 787 (July) 1927) also gives a discouraging prognosis in cases of paresis treated with tryparsamide as a chief therapeutic agent, assisted by mercury and bismuth and frequent spinal drainage. In his clinic there was a remission in 40 per cent in unselected cases.

C A Porteous and E C Menzies (Canad M A J 18 536 (May) 1928) regard tryparsamide as a valuable adjunct to the malaria treatment and should be employed (1) In cases in which malarial inoculations are contraindicated, (2) as an additional treatment after malarial inoculation, (3) as a preparatory treatment in certain selected cases.

H A Bunker, Jr (*ibid*) states that of 2460 malaria-treated cases collected in the literature, a full remission occurred in about 27 per cent with the production of an incomplete remission in an additional 26 per cent. The effect upon the changes in the spinal fluid is very definite but often gradual in its manifestations. Women seem to respond less readily than men.

Favorable results are also reported by J Lepine and L Bourrat (J de med de Lyon 10 397 (June 20) 1929) who state that tryparsamide is contraindicated in patients who show evidences of tuberculosis, diabetes and nephritis. These authors emphasize the importance of this drug as a preliminary treatment for alcoholism. They do not regard aortitis as a contraindication to malarial treatment.

J Schuster (Arch f Psychiat 85 695 (Nov) 1928) urges electrocardiographic examination before giving malarial treatment.

J Wagner-Jauregg (Rev neurol 1 889 (June) 1929) calls attention to the importance of lumbar punctures in all syphilitics for early diagnosis and the prompt inoculation with malaria. He stresses the fact that all doubtful cases especially those of meningo-vascular lues, which retain positive reactions in spinal fluid should be treated as potential paretics. He stresses the fact that the maximum benefit for malaria may not appear for many months, both from clinical and serological standpoints.

Of the other forms of fever therapy for dementia paralytica, rat-bite fever (*sodoku*) has been employed with favorable results by C Grabow and J Krey (Ztschr f d ges Neurol u Psychiat 121 621 (1929)).

Harry Goldsmith (Am J Psychiat 9 501 (Nov) 1929) reports the result of non-specific protein therapy (combined typhoid and para-typhoid vaccine) in the treatment of 55 unselected cases of neuro-syphilis with favorable results. The advantages of this treatment are that it is better tolerated, more benign in reaction, has fewer contraindications than malaria, and is more easily controlled.

C A Neymann and S L Osborne (Illinois M J. 56 199 (Sept) 1929) make a preliminary report of the use of high-frequency current for production of fever-therapy in general paresis

**PAROTITIS.** See MUMPS

**PARROT'S DISEASE.** See PSITTACOSIS

**PELLAGRA.—DIAGNOSIS** — Ferrell and Venable (Texas State J Med 24 196 (July) 1928), describe an antigen used for the complement fixation test of pellagra and report their results in 500 cases. They regard it as a specific serum reaction for pellagra as valuable as the complement fixation reaction for syphilis

**ETIOLOGY**—In an editorial in the Journal of the American Medical Association (92 637 (Mar 1) 1930) doubt is expressed as to the rôle of diet in the causation of pellagra. The history of the disease, its limited geographic distribution, its peculiarities of age and sex incidence, its confinement, at least in Europe, rather closely to a certain class of population, have raised doubts as to whether, after all, the disease might not be due to some infectious process

E H Cluver (Brit M J 2 751 (Oct 26) 1929), states that pellagra has been rare in South Africa though the Bantus are largely and often almost exclusively maize-eating. Only 3 outbreaks of any significance are reported

J Goldberger (Pub Health Rep 42 2193 (Sept 2) 1927) states that the disease is largely restricted to the region south of the Potomac and Ohio rivers, and in this area it is a common cause of death. He concludes that this distribution is due

to differences in dietary habits and food distribution. He claims a faulty diet to be causative, a diet lacking in a vitamine called "P-P" (pellagra preventive). He suggests a more liberal use of tomatoes in the late winter and spring

S E Sweitzer (Minnesota Med 11 719 (Nov) 1928) considers alcohol partly causative in the 8 cases of pellagra reported from Minnesota recently. He, however, believes some other factor to be necessary and thinks that alcohol by disturbing the normal metabolism makes the real factor potent

Goldberger and Wheeler (Pub Health Rep 43 1385 (June 8) 1928) state that "black tongue" in dogs can be produced by feeding them a pellagra-producing diet. It is highly probable that experimental black tongue and pellagra are essentially identical conditions and that the "preventive" of black tongue is identical with pellagra preventives or factor "P-P"

**TREATMENT**—On the basis of the indications afforded by the tests in the dog, liver, salmon and egg yolk are recommended in the treatment and prevention of pellagra in the human being. Hog liver, so valuable as a pellagra-preventing factor in the dog, had not been used in man

**PEPTIC ULCER OF THE ESOPHAGUS**—The recognition of peptic ulcer of the esophagus as a clinical entity has been a matter of comparatively recent date, although isolated cases have been reported as early as 1839. The obscurity of this condition has probably been due to the fact that it closely resembles a similar affection of the stomach and

duodenum, and since they may occur simultaneously, the esophageal lesion has been overlooked. The frequency of peptic ulcer of the esophagus varies with different authors. M J Stewart and S J Hartfall (J Path and Bact 32 9 (Jan ) 1929) report only 1 case encountered in over 10,000 autopsies, while Chevalier Jackson (J A M A 92 369 (Feb 2) 1929) states that in over 4000 cases of disease of the esophagus, peptic ulcer was diagnosed in 88 cases, 21 of which were active.

The etiology is somewhat similar to the same condition in the stomach and duodenum. Focal infection is a most important factor. The continued regurgitation, or vomiting of acid gastric secretion, as in pyloric obstruction and gastric dilatation, has a corrosive action upon the mucous membrane. Other predisposing factors pointed out by various authorities are local disease of the blood vessels, as varicosities, nervous disturbances, such as cardiospasm, trauma and extensive external burns.

**SYMPTOMS** — The prominent symptoms are pain, vomiting, dysphagia, and hemorrhage. Perforation may occur.

*Pain* is a very constant symptom. It usually appears in the epigastrium, at the xiphoid cartilage or beneath the sternum and frequently radiates over the thorax or to the back between the shoulder blades. It may be mild, or intense, or of a burning character, and is usually increased by pressure in the epigastrium or over the lower sternum. Pain may occur without swallowing, but is always increased during the act of deglutition. This sign distinguishes it from gastric ulcer. The pain is less severe when swallowing liquids, therefore the patient

becomes fearful of food, restricts his diet and becomes very much undernourished. In some cases reported, pain came on a half hour after meals. This yielded so promptly to alkalis as to justify the conclusion that the pain was due to acid.

*Dysphagia* is significant. At first it is observed only in taking solids, but later there is difficulty with liquids and, finally, but very small amounts of nourishment can be consumed. The dysphagia is produced by spasm of the esophagus.

*Emesis*, or regurgitation, has been observed in about 50 per cent of cases. Regurgitation is far more frequent than actual vomiting, with which it is often confused. Von Hacker and Latheissen conclude that if large amounts of food are regurgitated, a stenosis has occurred. As a result of regurgitation, nutrition is disturbed and the patient loses weight and strength.

*Hemorrhage* is not as constant as pain, dysphagia, or regurgitation. At times but small amounts of red or reddish-brown blood are regurgitated. Occasionally large quantities of dark blood of coffee-ground appearance are brought up, due to the accumulation of small amounts which have slowly passed into the stomach. In some instances, all or part of the blood passes through the bowel, producing a black tarry stool. When visible hemorrhage is not observed, occult blood may be found in the stools. Anemia and loss of strength and weight result from these small hemorrhages. It is extremely difficult at times to determine whether the hemorrhage arises from the stomach or esophagus and this is even more difficult when one remembers that an

esophageal ulcer may co-exist with a gastric or duodenal one. Frank hemorrhage may occur. Curshmann noted that in hemorrhage from a ruptured esophageal vessel, the blood usually pours out without producing the nausea or straining that is usually observed in gastric hemorrhage.

**COMPLICATIONS.**—*Perforation* is a rare complication, but is usually fatal. It is recognized by signs of the sudden onset of a perforative peritonitis or by sudden pain in the chest with dyspnea and collapse followed by mediastinitis, pneumothorax or hydropneumothorax.

**DIAGNOSIS**—In most instances the disease is latent, or symptoms may be so mild that the condition may not be suspected. The initial signs are not sufficiently characteristic to make a diagnosis and only after a considerable period frank symptoms manifest themselves, in fact, the ulcer may remain latent until perforation or hemorrhage takes place. The onset is usually gradual, beginning with vague dyspepsia.

The diagnosis of peptic ulcer of the esophagus is difficult and in some cases remains obscure until hemorrhage or perforation occurs. However, in other cases it may be made with a considerable degree of certainty. Pain associated with dysphagia, situated beneath the sternum and radiating to the back and between the shoulder blades is of great importance. Tenderness over the lower portion of the sternum or upper epigastrium is usually present. Frequent vomiting and regurgitation of food is significant. Co-existing history of ulceration of the stomach and duodenum or occult blood in the

stools is additional evidence in the favor of this affection.

According to Chevalier Jackson (*loc cit*), deductive methods of diagnosis have no place in the diagnosis of disease of a viscus so easily and safely inspected as the esophagus. Use of the x-rays, fluoroscopy and esophagoscopy aid considerably. X-ray examination should precede esophagoscopy, but if negative, it does not rule out ulcer, as it is positive only in long standing cases. Erosion with its characteristic spastic phenomena, if constant, is suggestive of ulcer. In the penetrating or niche type of ulcer, the same filling defect is noted as in gastric ulcer.

**TREATMENT** consists of the eradication of all possible foci of infection. The further treatment of uncomplicated peptic ulceration is mainly dietetic, an attempt being made to prevent further irritation. Milk should be permitted in small quantities at frequent intervals for 10 days to 2 weeks, following which soft food may be allowed, always in small quantities. Early in the course of treatment olive oil may be administered. Alkalies should be prescribed in the form of calcium carbonate, sodium bicarbonate, and bismuth subcarbonate, the latter especially in large doses at bedtime. When *spasm* of the esophagus is present, *bella-donna* gives great relief. Considerable relief is obtained by direct application of various remedies through the esophagoscope.

Relief from severe pain may be obtained by anesthetizing the ulcer with *novocaine*. Jackson (*loc cit*) advises weekly endoscopic applications of 10 per cent silver nitrate and between these esophagoscopic insufflation of

bismuth subnitrate. If healing does not occur, gastrostomy should be performed. This places the esophagus at complete rest and nutrition may be fully maintained until complete healing has taken place. Evidence of complete recovery is obtained by the disappearance of symptoms, absence of occult blood in the stools, direct endoscopic examination and x-ray study.

**PERITONEUM.—ABSORPTION OF BLOOD**—From experiments on dogs, H W Florey and L J Witts (*Lancet*, 1 1323 (June 30) 1928) conclude that blood injected into the peritoneal cavity is absorbed by the diaphragmatic lymphatics and enters the circulation by the thoracic duct. In the dog, absorption is very slow, only one-sixteenth of the corpuscles being absorbed in about 6 hours, the plasma being absorbed more rapidly. Vigorous respiration, abdominal muscles of good tone, and massage of the abdomen promote the absorption. Much blood remains for many hours in the abdominal cavity, and there is danger of infection. Abdominal transfusion of blood is not likely to compare in value with the intravenous route in the treatment of shock and collapse, it seems a rational form of treatment for the more serious forms of anemia.

On the basis of experimental studies, J P Sparks and V C David (*Surg Gynec Obst* 48 780 (June) 1929) conclude that autogenous blood together with varying types of pathogenic micro-organisms injected into the peritoneal cavity of dogs, rabbits, and guinea-pigs does not predispose to the production of peritonitis. This, however, is contrary to the clinical

experience as well as the experimental work of Halsted, performed many years ago, showing that the virulence of peritonitis is greatly increased by the presence of intra-abdominal blood clots.

**IMMUNITY**—Attempts to increase the intraperitoneal leukocytosis by the use of sterile irritants have shown that the surgical mortality was not influenced by this method of pre-operative preparations. S F Herrmann (*Arch Surg* 18 2202 (May) 1929), however, ascertained from animal experiments that the intraperitoneal injections of the combined vaccine of streptococci and colon bacilli are strikingly effective in affording protection against subsequent fecal soiling. This protective effect is probably due to the development of specific local peritoneal immunity. Herrmann stresses the point that bacterial peritonitis in reality is a defensive reaction. It is suggestive that a relatively low peritoneal immunity leads to peritonitis, while relatively high peritoneal immunity leads to recovery without peritonitis.

The experiments of P Steinberg and H Goldblatt (*Arch Int Med* 42 415 (Sept) 1928) upon dogs suggest that it is possible to prevent death from fecal peritonitis by active immunization with colon bacilli but that killing by heat greatly diminishes the antigenic power of the micro-organisms. Thus the intraperitoneal injection of living colon bacilli followed 15 days later by the intraperitoneal injection of feces in 10 dogs was followed by only 1 death. Eight dogs were immunized by colon bacilli killed by heating at 58° C (136.4° F) for 1 hour. In this group, death fol-

lowed in 5 dogs after injection 14 days later of solid feces

**PERITONITIS.—ETIOLOGY—**F Unterberger (Zentralbl f Gynak 53 90 (Jan 12) 1929) reports the cases of 2 women who contracted peritonitis, apparently through the vagina, while menstruating. One used sanitary napkins contaminated by her sister who had a febrile abortion, and recovered after operation, and the second patient developed peritonitis after caring for her husband ill with facial erysipelas and died despite operation.

**TREATMENT—**J Knopp (Zentralbl f Chir 55 923 (Apr 14) 1928) used **colon bacillus serum** in the post-operative treatment of 10 cases of diffuse peritonitis and other kindred conditions. In 2 cases of perforative peritonitis and 4 cases of diffuse peritonitis following appendicitis with perforations, improvement followed. In 1 patient, anaphylactic shock was followed by death the following day, and in the 3 remaining cases the administration of the serum failed to be of value.

H Kohler (Zentralbl f Chir 55 - 2441 (Sept 29) 1928) has used **colon bacillus serum** in 14 cases of peritonitis, apparently with good results. Injections of 1 cc (16 minims) of serum are given intramuscularly one-half hour before operation, and immediately after the operation another dose of serum may be given intravenously. The dose may be repeated if necessary, and the author has never noted any untoward results. All of the patients recovered, although the temperature was not influenced in any way, nor was the course of the suppuration, and intestinal peristalsis

remained unaffected. Apparently, the action is entirely antitoxic.

Five cases of general peritonitis following appendicitis were treated by T G Orr and R L Haden (Arch Surg 18 2159 (May) 1929) by **enterostomy**, with 3 deaths, and as enterostomy is of no value in the treatment of dogs with a fulminating general peritonitis, it is probable that the cause of death in general peritonitis is not intestinal obstruction alone, and enterostomy in man is of doubtful value. In selected cases of peritonitis of the lower part of the abdomen, however, enterostomy may be life saving and should be used in doubtful cases. Large quantities of **saline solution**, to relieve the dehydration and hypochloremia, should be employed in all cases. Animals treated with 1 per cent solution of sodium chloride hypodermically in addition to ileostomy lived 3 times as long as those who were not given the salt solution. The salt was found to be effective in preventing the chemical changes in the blood which occurred in animals not receiving such treatment.

**PRIMARY PERITONITIS IN CHILDREN—**By primary peritonitis is meant that form of peritonitis which develops in the absence of intra-abdominal disease. Of 38 cases of peritonitis in children, excluding localized peritonitis due definitely to ruptured or gangrenous appendicitis, which was studied by A G De Sanctis and R A Nichols (Arch Pediat 46 17 (Jan) 1929) from the babies' wards of the New York Postgraduate Hospital during a period of 10 years, 21 (55 per cent) were of the primary type. The ages of the children ranged from 7 weeks to 13 years. Five of the patients were under 1 year of age,



8 under 2 years, and 14 under 5 years. The bacteria most frequently found were the *pneumococcus* and *Streptococcus hemolyticus*.

In the cases reviewed, the *Streptococcus hemolyticus* was the most common micro-organism. The infection may involve the peritoneum by way of the blood stream, the gastrointestinal tract, the external genitalia and the Fallopian tubes in females, or the lymph stream. In most of the cases, the focus of infection seemed to be from above the diaphragm. Predisposing factors are unhygienic surroundings, addiction to alcohol, hereditary influences, attacks of indigestion, malnutrition, wasting diseases, and trauma. The condition is said to occur about 3 times as frequently in females as in males, but in the series of cases observed it occurred about equally in both sexes. The onset is usually sudden. In 14 of the cases, vomiting was the initial symptom. In 15 cases, pain was apparently present. Constipation and diarrhea were about equal in frequency and seemed to be of no diagnostic significance. Intense toxemia was the outstanding symptom. Of the physical signs, distention and tenderness were usual, but intense and board-like rigidity was found in very few cases. Free fluid, demonstrated by shifting dulness, was present in less than half of the cases. The temperature ranged from 102° to 107° F (38.9° to 41.6° C), the leukocytes averaged 19,200, and the polymorphonuclear percentage ranged from 80 to 96 per cent. In 10 of the cases, the infection could be attributed indirectly to acute infection of the upper respiratory tract or middle ear disease, in 4, the peritonitis was a complication of nephrosis. The gross

mortality was 85.7 per cent. In the 8 cases which were not operated upon, the mortality was 100 per cent, and in the 13 cases treated by **laparotomy** and **drainage**, 76.9 per cent. The authors conclude that primary peritonitis in children is more common than is generally believed, and that laparotomy and drainage are undoubtedly indicated in this condition.

**PNEUMOCOCCAL PERITONITIS IN CHILDREN** — Thirty-one cases of pneumococcal peritonitis are recorded by H. Salzer (*Deutsche Ztschr f Chir* 208:226 (Feb.) 1928), which occurred in the Mauthner-Markhof Children's Hospital at Vienna in the last 20 years. Twenty-eight were girls and only 3 were boys, the greater frequency in the female being probably due to an ascending infection from the vagina. In 21 cases, the correct diagnosis was made before operation. In the 3 boys, the disease originated in a pneumococcal appendicitis, but in none of the girls was a pneumococcal appendicitis present. In girls, an early operation should be avoided as 6 of 8 girls so treated died, but, after the initial symptoms have subsided, **incision** and **drainage** should be employed. This was successful in 15 patients. As in the 3 boys the disease originated in a pneumococcal appendicitis, Salzer concludes that in boys it is not necessary to make a differential diagnosis between appendicitis and pneumococcal appendicitis, and that an operation should be performed at once.

A case of pneumococcal peritonitis developing the ninth day after normal delivery is reported by H. F. Seymour (*J Obst Gynec Brit Emp* 34:793, 1927). The abdomen was opened and

drained, with a recovery after a greatly prolonged convalescence

Five of 6 cases of pneumococcal peritonitis reported by D C Elkin (Arch Surg 18:745 (Feb) 1929) occurred in girls. In 3, the condition followed pneumonia, and in the other 3 it was apparently primary in the peritoneum. One died before the operation was performed, and 2 were operated upon and recovered. Secondary peritonitis is usually fatal, the *prognosis* being better in the primary form. The 6 cases occurred in about 30,000 hospital admissions.

Twelve cases of diffuse pneumococcal peritonitis, all in girls, are reported by P Mathieu and Davioud (Presse méd 37 909 (July 13) 1929). All the patients presented symptoms of acute appendicitis, but they had diarrhea which is rather uncommon in appendicitis. Pulmonary symptoms were rare, but sore throat was a common occurrence as a precursor of the abdominal symptoms. This, however, is also found in appendicitis. The authors advocate **expectant treatment**, though in doubtful cases **appendectomy** should be performed. It is desirable to avoid general anesthesia, and reduce to a minimum intra-abdominal manipulation. The pus is without odor and contains small fibrinous masses. The loops of the small intestine are often congested, and a false membrane may cover the appendix. In the treatment, **drainage** of the abdominal cavity and **anti-pneumococcic serum** are advised.

**PERTUSSIS (WHOOPING COUGH).—ETIOLOGY.**—Although the *Bordet-Gengou bacillus* is not universally accepted as the sole cause of pertussis, recent experi-

ments give increasing evidence of its specificity. L W Sauer and L Hambrecht (Am J Dis Child 37 732 (Apr) 1929) have inoculated the larynx of 5 monkeys and the noses of 3 others with a culture of this micro-organism and produced the typical symptoms and blood picture of pertussis. They recovered the bacillus in several cases from the nasopharynx of the infected animals and in those that died also from larynx and trachea. The animals which recovered were immune to subsequent inoculations.

The Bordet-Gengou bacillus is found in the throats and in the expectoration of patients suffering from pertussis most frequently in the early stages of the disease. T Madsen (Deutsche med Wchnschr 55 559, 1929) had his patients with pertussis cough on petri dishes containing suitable media and by this method recovered the Bordet-Gengou bacillus in 75 per cent of patients in the catarrhal stage, in 57 per cent during the first week of cough, in 61 per cent during the second week, in 45 per cent during the third week, in 40.5 per cent during the fourth week and in 9 per cent during the fifth week. Similar methods were employed by G M Lawson and M Mueller (J A M A 89 275 (July 23) 1927). Such a procedure would be valuable in making a positive diagnosis and limiting the time of quarantine if its accuracy is confirmed. Sugare and McLeod (Lancet 2 165 (July 27) 1929) found the bacillus in every one of 5 patients during the first week of pertussis and in 12 out of a total of 21 examined. They also stated that they could not find it in the nose, throat, bronchi and lungs of

patients who died of diseases other than pertussis. Other investigators, such as R. Debre, J. Marie and H. Pretet (Compt rend Soc. de biol 98 761 (Mar 16) 1928) have found many different strains of the Bordet-Gengou bacillus but by agglutination tests have demonstrated a relationship between them.

Chemical analysis of the pertussis bacillus made by M. Fukushima (Orient J Dis Infants, 3. 43 (May) 1928) showed that it had a comparatively high fat content. A lymphocytic reaction was produced when the bacillus was injected into the spinal canal of rabbits but when the bacilli without this ether-soluble material were injected a polymorphonuclear reaction occurred.

**COMPLICATIONS.**—M. Giuffrè discusses *nervous complications* of pertussis (Arch de méd. d enf 32 82 (Feb) 1929) including convulsions, spasm of the glottis, involvement of the special senses and more rarely, meningitis, disseminated sclerosis, spinal nerve lesions with flaccid paralysis and polyneuritis and such psychic changes as dementia and night terrors. The author stressed the rarity of gross hemorrhage in the brains of patients suffering from these complications and described the characteristic pathologic changes he had found. There were usually degenerative nerve cell lesions, occasionally meningeal infiltration, hyperemia and small hemorrhages in the brain tissue near the meninges.

The probable explanation of these brain lesions is the action of a toxin developed by the pertussis bacilli. W. G. Sears (Brit J Child Dis. 26 178 (July-Sept) 1929) held this opinion and suggested that the micro-

organism may activate some other virus which produces the changes. According to him, the usual brain lesion is a meningo-encephalitis which may predispose to gross hemorrhage into brain tissue when the strain of passive congestion is added at the time of paroxysm.

*Sneezing attacks* sometimes replace the paroxysms of whooping-cough either in part or entirely and 2 such instances have been described by H. S. Reichle (J A M A 92 443 (Feb 9) 1929), and by Moncrieff and Lightwood (Arch Dis Childhood 4 240 (Aug) 1929).

**TREATMENT.**—A great variety of treatments have been supposed to have some beneficial effect on the symptoms of pertussis. K. Okutani (Japan J Inf Dis 2 957, 1928) reported relief with **rectal injections of ether**. Ten to 15 cc ( $2\frac{1}{2}$  to  $3\frac{3}{4}$  drams) of ether in oil was given per rectum twice a day to 104 patients and the paroxysms were reduced in number and severity in about 85 per cent. Magliano (Semana Medica 2 643 (Aug 29) 1929) has employed a 20 per cent emulsion of ether in liquid petrolatum by the same method with good results.

Further study of the action of **ultra-violet light** on pertussis has been reported by W. W. McCaw (Texas State J Med 24 224 (July) 1928). His patients were stripped to the waist and those under 2 years of age were given a maximum exposure of  $2\frac{1}{2}$  minutes front and back and those over 5 years were given a maximum of 5 minutes. In his series of 201 children and 25 adults, 52 per cent had relief from vomiting and coughing, 38 per cent were improved and 10 per cent remained unchanged.

Adults responded better than children. Improvement in symptoms began after the second or third treatment, as a rule, and the total duration of the disease was shortened 2 or 3 weeks in a large number of the patients.

J. Becker (Munchen med. Wchnschr 75 1070 (June 22) 1928) reported an intensive study of 2 children in his own family who were treated with ultra-violet light during a course of pertussis and concluded from this that the action of the light greatly relieved the symptoms and shortened the course of the disease.

The status of vaccine therapy both as a treatment and as a prophylactic measure remains unchanged and most of the writers on the subject regard it with little favor.

**PHARYNX.**—J. M. Bourn (J Prev Med 2 441 (Nov) 1928) found Pfeiffer's bacillus with relative frequency in normal throats in inter-epidemic times. In one period marked by an unusual number of acute respiratory infections, the incidence of this organism in persons with normal throats was considerably increased. The organism was found much more frequently in throat cultures from patients with pulmonary tuberculosis, lobar and bronchopneumonia, colds, and sore throats, than in persons who were perfectly well. No consistent decrease in the incidence of this organism in throats, since the 1918 epidemic is indicated.

The various forms of *acute pharyngitis* are intimately related to the specific infections in the throat, such as *diphtheria*, *Vincent's angina*, *septic sore throat*, *scarlet fever*, *agranulocytic angina*, *leukemia*, etc.

Of the *chronic types* of inflammation, the *hyperplastic form* is most common, this occurs in those people whose occupation requires them to use the voice a great deal, such as singers and clergymen. On examination, the post-pharyngeal wall has a granular appearance. This is due to a lymphoid enlargement and an irregular thickening of the mucosa. These granular masses vary in size and numbers. One often sees, especially in children who have had their tonsils and adenoids removed at a very early age, large bands of pseudo-lymphoid masses along the lateral pharyngeal wall just behind the pillars and extending up into the nasopharynx. The chief symptom is a tickling feeling in the throat with cough due to an accumulation of thick, tenacious mucus which is usually present in the morning when the patient awakens and which necessitates much hawking and coughing before it is all expelled. The mucosa always looks red and inflamed.

Treatment is directed toward removing any pathology in the nose, nasopharynx and throat, **voice hygiene** and **local treatment**, either surgical or medical. If the follicles are large, they can be destroyed by **cautery** or **curettage**. The medical treatment consists in the application of **silver preparations** such as silver nitrate 5 to 10 per cent solution. A certain amount of relief is obtained by the use of **lozenges**.

M. Nadoleczny (Munchen med Wchnschr. 74 2009 (Nov 25) 1927) maintains that many cases diagnosed as *chronic pharyngitis* started as a *neurosis*. The disturbance was frequently first noticed after straining the voice.

or after taking cold. In another group the throat symptoms appeared after times of excitement or anxiety. The morbid attention to the throat results in hawking, this, by a vicious circle, results in increased secretion of mucus and in the local phenomena of inflammation.

Of interest because of its high mortality and morbidity rates is *septic sore throat*. H. L. Lombard (J. Prev. Med. 3: 81 (Mar.) 1929) states that there were between 925 and 975 cases and 48 deaths in the epidemic of septic sore throat in Lee, Massachusetts in July, 1928. The epidemic was caused by the transmission through raw milk, of hemolytic streptococci from the infected udder of a cow. The incubation period of the disease averaged 2 days. Over 90 per cent of the cases occurred within an interval of 2 weeks.

*Infectious diseases of the upper air passages can give rise to metastatic genital conditions* as shown by H. Kustner (Deutsche med. Wchnschr. 48 (Nov. 28) 1928). If the infection occurs during menstruation, an *acute endometritis may supervene*, which is made known by the stale, evil-smelling odor and pus-like appearance of the flow. If the pharyngeal infection occurs during ovulation, an *acute unilateral adnexal inflammation* can result. He believes that in the presence of acute and suddenly appearing genital disturbances, irregular bleeding, unilateral adnexal swelling, discharge, etc., one should take in consideration the possibility of metastatic genital disease, if some time previously an infectious disease has been present.

*Stenosis of the pharynx* usually re-

sults from *cicatricial contraction of a quimma*. Dilatations are intimately related to *diverticula*. These pouchings are usually of the pulsion type and emerge in the posterior midline between the oblique and transverse fibers of the cricopharyngeus muscle. Noisy deglutition is one of the earliest and most constant signs. As the sac fills up there is an uncomfortable sensation of fulness in the neck with regurgitation of unaltered food. Treatment is **surgical**.

Various operations are resorted to in eradicating *malignant disease* of the pharynx. W. Trotter (Brit. J. Surg. 16: 485 (Jan.) 1929) discusses *epitheliomata* in the laryngeal portion of the pharynx, and he classifies them into 4 groups, depending on the anatomical location of the tumor. For each group a special type of operation is necessary.

**PINEAL GLAND.**—The function of this organ is unknown. The evidence in favor of the idea that it is concerned in sexual development is fragmentary and inconclusive from the experimental side. On the clinical side, observations made from patients with pineal tumor are suggestive. Many young patients show precocious sexual development and adiposity.

K. O. Haldeman (Arch. Neurol. and Psychiat. 18: 724 (Nov.) 1927) considers that the eye symptoms are significant in localizing pineal tumors. Characteristic are the paralysis of upward movement, diplegia, abducens paralysis, nystagmus, ptosis, and absence of the pupillary light reflex. General symptoms are intracranial pressure, headache especially in the occipital region, vomiting, choked

disc, mental apathy, somnolence, clonic spasms, and incontinence of urine and feces

Studies on the histology of the gland have indicated that sympathetic cells are not present as was formerly believed. The pineal contains a few neuroglia cells and certain special elements called parenchyma cells. Isolated ganglion cells are found. The lobules of the gland are made up largely of parenchymatous cells which constitute the greater part. These are stellate with smooth, flexible processes which divide and frequently end in key-shaped enlargements at the edge of the lobules or the end of the vascular adventitia. Several types of neuroglia cells are found on silver staining. They form complex perivascular systems.

**PITUITARY GLAND**—E P Bugbee and O Kamm (Endocrinology 12 671 (Sept-Oct) 1928) have demonstrated that the posterior lobe of the pituitary contains 2 active principles: an oxytocic, which causes contraction of the uterus, and a pressor principle which raises blood-pressure. These 2 principles have been separated and are available as stable water-soluble powders. The oxytocic principle is named alpha-hypophamine, the pressor principle is called beta-hypophamine. The latter stimulates peristalsis in the alimentary tract but does not affect uterine muscle. It is also diuretic and anti-diuretic according to condition and concentration. The secretion of the posterior lobe is apparently passed on to the cerebro-spinal fluid. A Geesink and S Koster (Nederl Tijdschr v Geneesk. 2 6046 (Dec 8) 1928) found that con-

traction of the guinea-pig uterus was caused by this fluid from normal dogs, and to lesser degree by that from hypophysectomized animals.

Recent interest in the pituitary is centered about the functions of the anterior lobe and the relations to gonadal incretory activity. B Zondek (Zentralbl f Gynak 53 834 (Apr 6) 1929) has prepared a hormone from this portion of the gland which he calls "prolan." With Aschheim, he has shown that it stimulates ovarian activity. Estrus is induced when the extract is injected into immature rodents. Prolan differs from folliculin, it is destroyed by alkalis, acids, and heat. It is soluble in water, insoluble in ether, and precipitated by alcohol and acetone. Its administration to infantile rabbits yields large ovaries with hemorrhagic luteinized follicles. It also stimulates development of genitalia in males, particularly of the seminal vesicles. In rats it is effective when given orally. Women injected with prolan a few days before laparotomy show hyperemia of the vagina, uterus and tubes. The intramuscular injection increases the rectal and vaginal temperature above that of axilla.

In endeavoring to restore menstruation by prolan it is important to distinguish the *amenorrhea* of hyper-follicular activity from that of the depressed state. The former types do not respond.

H M Evans and M E Simpson (J A M A 91 1337 (Nov 3) 1928), find that 2 hormones are secreted by the pars anterior of the mammalian hypophysis, one required for normal growth and the other for normal de-

velopment of the gonads, thyroid and suprarenal cortex

As regards its effect on the sexual system, the second hormone can be completely nullified by simultaneous administration of the first, the growth substance. Evidently nature has provided the necessary nice adjustment in the relative amounts of the 2 substances secreted. That the growth of animals is usually accomplished before the attainment of sexual maturity may, therefore, plausibly be due solely to the early predominance of the growth hormone.

Their experiments are in consonance with the identification of the 2 hormones of the anterior gland from the basophilic and the eosinophilic, 2 sharply separated cell types.

T J Putnam (Arch Surg 18 1699 (Apr) 1929), was able to produce acromegaly in a dog by injections of anterior lobe of beef hypophyses. The dog grew to almost twice the weight of its litter-mate control. It developed among other conditions, enlargement of the acral parts, polyphagia, asthenia, sialorrhea and spontaneous lactation. The animal succumbed to myocardial failure and edema of the lung. A skeletal overgrowth with hyperostosis was present. There was a generalized splanchnomegaly, affecting the thyroid and genital tract most strikingly. The thyroid was hyperplastic, there were adenomas of the suprarenal gland and the ovaries contained ripe but unruptured follicles. The condition produced appears to merit the designation of experimental acromegaly.

Clinical evidence of a relationship of pituitary anterior lobe function and gonad incretory activity in both sexes is available. Teel reports a

case of progressive *acromegaly* in a woman in whom at autopsy hypertrophy of the genitalia was found. There were no striking histological changes in the ovary. Study of the hypophysis showed that the disturbance was attributed to an eosinophilic *adenoma*. R C Moehlig (Arch Int Med 44 339 (Sept) 1929) reports a case of a man aged 52 in whom a gradually developed impotence, feminine pubic hair distribution, and gynecomastia developed and at autopsy a chromophobe *adenoma* of the hypophysis was found. Further physiological evidence is presented by O. Riddle and Florence Flemion (Am J. Physiol 87 110 (Nov) 1928). They also found that daily transplants of fresh anterior lobe produced increased growth of the testes in immature pigeons. It is worthy of note that the larger pituitary in the female is associated with a longer intestine in this sex as compared with the male. All these observations attest succinctly to the fact that reproductive progress and development are strongly factored by anterior lobe activity.

Certain other physiological reactions to anterior lobe extracts are of interest. It may cause a rise in basal metabolism. Pathological overgrowth with splanchnomegaly, hyperplasia of thyroid and adrenal cortex in association with the following symptoms are observed *e.g.*, polyphagia, polydipsia, polyuria, lactation, asthenia and physical inactivity. Blood cholesterol tends to rise. No observable change occurs in serum protein, calcium, phosphorus, or sugar. Acromegaly can be induced. It has been also found that digests of the anterior lobe of the calf or steer

pituitary caused not only a larger proliferation of fibroblasts than had previously been obtained in artificial media, but the rate of multiplication of sarcomatous fibroblasts of the rat was as great in this media as in embryo juice. Further, anterior lobe preparations stimulate metamorphosis of amphibia. This action is supposed to be through the thyroid. All these data demonstrate that the anterior lobe of the pituitary is a significant factor in the growth of the organism.

**EFFECTS OF HYPOPHYSECTOMY**—P E Smith (J A M A 88 158 (Jan 15) 1927) has found that hypophysectomy produces an invariable and characteristic syndrome in the rat, the chief features of which are an inhibition in growth in the young animal or a loss of weight in the mature animal, atrophy of the thyroids, suprarenal cortex and sex organs, weakness and cachexia. The animal survives for months.

The disabilities arising from hypophysectomy can be completely or nearly completely cured by daily pituitary homotransplants. Intraperitoneal injections of saline extracts (suspensions) made from ox pituitaries, prepared by the method of Evans and Long, do not repair the atrophied thyroids or suprarenal cortex, and these injections not only do not repair the atrophied sex organs, but prevent their repair by the pituitary transplants. Skeletal growth is stimulated by injection of the bovine fluid.

A lesion of the hypothalamic region of the brain (tuber cinereum) gives rise to a syndrome which is distinct from that caused by pituitary ablation. This tuberal syndrome is characterized by extreme obesity and an

atrophy of the genital system, neither the thyroids nor the suprarenal cortex atrophy. In certain cases the total length of these animals may be reduced, in other cases it is unaffected.

In conjunction with C L Foster (J A M A 87 2151 (Dec 25) 1926), this same author finds that the basal metabolism of totally hypophysectomized rats was found to be about 35 per cent below the average of normal animals. The metabolic rate of these animals may be restored to normal by daily anterior pituitary homotransplants or by daily injections of thyroid extract, but not daily injections of posterior lobe extract.

Turning now to the clinical aspects of pituitary disorder, Reye (Deutsche med Wchnschr 54.696 (Apr 27) 1928) lists the following as the earliest signs in *atrophy* of the *anterior lobe* in females: difficult childbirth, severe hemorrhage with slow recovery but without sepsis and followed by absence of menses, disappearance of libido, adiposity, increasing weakness and mental depression, paleness of the skin, loss of hair and teeth, subnormal temperature, chilliness, gastro-intestinal disturbances, eosinophilia, low blood-pressure, and reduced basal metabolism. A later symptom is cachexia. An increased sugar tolerance is frequently formed.

A type of *headache* characteristic of pituitary dysfunction is beginning to be recognized. C H Lawrence (Ann Otol, Rhinol and Laryngol 34 694 (Sept) 1925) describes it as almost always temporal or frontal, often extending up to the vertex but rarely involving the entire head. It is usually described as a dull, throbbing ache, and may be associated



with a slight vertigo. It is necessary to make a careful examination of the accessory nasal sinus in order to differentiate the pituitary headache. Timme contends that any enlargement of the pituitary body is potentially productive of pressure within the sella turcica and hence a headache. Such a distress comes on periodically whenever the patient indulges in overexertion, concentrates on some particular problem, fasts for a few hours, or becomes unduly tired. X-ray examination helps in identifying the condition, *i.e.*, the small sella will be found. *Pituitary headache* is diagnosed by absence of organic cause, *e.g.*, migraine, evidence of excessive height or weight, past or present, examination of retinal and visual fields, and determination of the basal metabolism and sugar tolerance. Pituitary headache is more common before puberty but may also occur in older people. The treatment depends on the character of the functional derangement. In many cases the use of **fresh anterior lobe extract** controls the condition.

From a study of some 42 pituitary cases W. C. Meninger (J. A. M. A. 91: 951 (Sept. 29) 1928) comes to the conclusion that there is no uniformity of any particular mental picture with any type of pituitary disorder. In general it may be said that the majority of cases of preadolescent *hypopituitarism* show some degree of intellectual retardation while the post-adolescents tend towards schizophrenia. In late *hyperpituitarism* the cyclothymic reaction predominates. Treatment of *pituitary tumors* swings between surgery and x-rays or radium, depending on conditions. With x-rays, success can only be expected when

the growth is cellular or adenomatous in type. Cystic enlargements are obviously refractory. When treatment is successful almost immediate improvement is noticed. In certain cases the results can be improved by radiating other glands besides the pituitary. The intervals between the single irradiations should not be longer than 6 months.

**TUMORS** —H. Cushing and L. Eisenhardt (Arch. Ophth. 1: 1 (Jan.); 1: 168 (Feb.) 1929) outlined the clinical syndrome accompanying meningiomatous tumors arising from the tuberculum sellæ. These neoplasms from their mesially placed position produce ophthalmologic symptoms as their first manifestation. Since visual field defects and primary optic atrophy appear early, at a time when the tumor is favorable for operative removal, it is important that the significance of these symptoms should be realized promptly. Furthermore, in this early stage of their development, these tumors do not deform the sella turcica nor cause secondary symptoms of hypopituitarism. If, in a middle-aged person, therefore, bitemporal constriction of the visual fields with primary optic atrophy occurs, even though there be no x-ray evidence of changes in the sella, the presence of a tumor of this type should be suspected. The earlier the proper diagnosis is made and operation performed, the better will be the result. These tumors recur very slowly, so that even following a partial removal, unless vision has been allowed to deteriorate too far, the result should be very satisfactory.

**PITUITARY IN DIABETES INSIPIDUS** —It has been found that diabetes insipidus can be treated satis-

factorily by the endonasal administration of dried *pituitary* preparation in the form of *snuff*. L. E. Schwarz (Illinois M J 55 203 (Mar) 1929) has had satisfactory results with this procedure. J. R. Campbell, Jr and H. L. Blumgart (Am J M Sc 176 769 (Dec) 1928) have used cotton pledgets soaked in a solution of posterior lobe extract placed high in the nasopharynx and have obtained definite decrease in water intake and urinary output.

#### PITUITARY (ANTERIOR) HORMONE.—RELATION TO FEMALE GENITAL ORGANS—

The discovery of the interrelationship of the anterior hypophysis to the female genital organs is perhaps the most important recent contribution to sex physiology. Particularly outstanding in this field of research have been the investigations of Smith and Engle, of Aschheim and Zondek, and of Evans and Long.

P. E. Smith (Proc Soc Exper Biol and Med 24 131 (Nov) 1926) used daily transplants of the anterior lobe of the pituitary to overcome hypophysectomy in the white rat. Not only was he thus able to restore an almost normal growth rate, but, in addition, was able to induce a partial repair of the injury to the sex glands.

P. E. Smith and E. T. Engle (Am J Anat 40 159 (Nov) 1927), were able to induce precocious sexual maturity in very young rats and mice by daily transplants, resulting in a stimulation of normal ovulation with an early appearance of estrus. They noted that the uterus became distended and hyperemic, and the ovaries enormously enlarged, due to the

increased number of maturing follicles and corpora lutea. Ovulation was enormously accelerated, as indicated by the large number of normal ova recoverable from the tube at autopsy ("superovulation"). In 1 mouse, 48 ova, capable of fertilization and of producing normal embryos, were found in 1 tube.

These vaginal and uterine changes could not be obtained in castrated animals, thus indicating that the anterior pituitary hormone produces its effect only through the agency of the ovary.

B. Zondek and S. Aschheim (Arch f Gynak 130 1, 1927) working independently, likewise succeeded in producing premature puberty in young mice by hypophyseal transplantation.

In contrast to the method utilized by Smith and Engle, (*loc cit*), these investigators made only a single implantation and obtained, accordingly, more moderate changes in the ovaries. They also noted a marked enlargement of the ovaries with considerable hyperemia, so that in some instances, hemorrhage occurred into the follicular cavities. Instead of superovulation, however, they found that the follicles more often remained unruptured with luteinization of the granulosa cells and imprisonment of the ova.

Zondek and Aschheim (*loc cit*) conclude from these observations, that the anterior pituitary body is the active "motor" agent that stimulates ovarian activity. The resultant indirect changes in the uterus and vagina are due to the effect of the ovarian follicular hormone thus produced.

O. Riddle (J A M A 92 943 (Mar 23) 1929) observed that glyc-

erin extracts of the fresh anterior pituitary of the ox, when injected daily for 7 to 17 days, caused a most extraordinary growth in the testes of every male dove thus treated, the normal weight being increased from 2 to 17 times. The females thus treated showed less marked, though definite effects.

These findings suggest, therefore, that the pituitary gland, and not the ovaries, provides the stimulus for puberty. Why the pituitary suddenly increases its activity at the time of puberty, however, remains a mystery.

The stimulation of ovulation, as reported by Smith and Engle (*loc cit*) and by Aschheim and Zondek (*loc cit*), is in direct contrast to the findings of Evans and Long, who were able to inhibit ovulation by the intraperitoneal injection of an alkaline extract of bovine anterior hypophyseal substance. Instead of superovulation, the latter investigators obtained an inhibition of ovulation, and a stimulation of the luteal tissues of the ovaries. Corpora lutea in large numbers were produced, many showing within them the imprisoned ova ("pseudocorpora lutea").

This inhibition of ovulation suggests the possibility of a similar agent being present in the human female that tends to delay the onset of sexual maturity, an agent that prevents the occurrence of maturity during infancy. Confirmation of this theory is afforded by H. M. Evans and M. E. Simpson (J. A. M. A. 91:1337 (Nov. 3) 1928), who succeeded in fractioning anterior pituitary extracts into 2 components and, therefore, attribute 2 hormones to the pituitary.

The first they term a "growth" hormone, and the second, a "gonad stimulating" or sex hormone.

Their observations indicate that the growth factor is the product of the eosinophilic cells of the anterior lobe, while the basophilic cells are related more specifically to gonad stimulation.

They point out the antagonism of these 2 hormones. The growth substance is said to be utilized until the body no longer requires it, when the maturity inducing substance gains the upper hand and is able to initiate ovarian activity. The latter fraction can be completely nullified by the simultaneous administration of the growth hormone.

The difference in the findings of Evans and his associates as compared with the results obtained by transplantation, can perhaps be explained by this fractionation. The alkaline extract of Evans and Long probably contains a marked amount of growth hormone which causes hyperluteinization of the follicles and delays ovulation, while implantations of fresh gland contain mostly the maturity inducing hormone which promotes ovulation.

F. A. E. Crew and B. P. Wiesner (Proc. Roy. Soc., Edinburgh, 1929), also claim to have isolated 2 different pituitary hormones from the anterior lobe. These they term rho I and rho II, respectively. They find that rho I stimulates the production of follicular hormone ("alpha") in the whole ovary and leads to ovulation and the formation of lutein tissue but not to its functioning. Rho II then activates this lutein tissue, thus stimulating the formation of the hormone of the corpus luteum ("beta"). This latter

hormone of the corpus luteum, in turn, stimulates and governs the preparation of the uterus for the nidation and gestation of the fertilized ovum (premenstrual changes)

Baniecki, Berlinger and Adachi injected placental extracts containing a large amount of ovarian hormone into female animals and observed typical pregnancy changes in the anterior pituitary gland. These changes appear as an increase of the chief cells and a relative decrease of the eosinophiles at the same time.

Male animals failed to show these changes, indicating that the ovarian hormone is sex specific. One may gather from these experiments that, though the pituitary hormone is highly important in the physiology of the female genital organs, it is, nevertheless, subservient to the regulating influences of the ovary.

The changes found in the pituitary during pregnancy thus appear to be maintained by the ovarian hormone or by the stimulus of a hormone formed by the trophoblast of the ovum.

From these observations it is apparent that there is a complete circle of interrelating and dependent links in this endocrine chain, the continuance of pregnancy (or trophoblast of the ovum) in the early months depending upon the proper functioning of the corpus luteum, this depending on the function of the anterior lobe of the hypophysis which, in turn, is believed to be governed by the functioning of the trophoblast.

**INDUCTION OF PREMATURE PUBERTY**—Premature puberty may be initiated by several means, the chief of which are.

1 The injection of female sex hor-

mone. Although this hormone does not induce ovarian function, some of the immature animals remain mature after injection, as shown by Frank and Rosenbloom as well as by Allen and Doisy.

2 The employment of implants or extracts of the pituitary gland.

3 The injection of the maturity inducing fraction of the anterior pituitary.

4 Pathological tumors involving the ovaries, adrenals or pineal body.

Before the first appearance of estrus, or in the human, of the first menstruation, a non-cyclical increase of ovarian production of "female sex hormone" takes place. According to Evans and Simpson (*loc cit*), this is probably due to the release of the "gonad stimulating" constituent of the anterior lobe. The quantity of ovarian hormone liberated is sufficient to activate the secondary female sex characters, especially those which induce the growth of bone and influence the appearance of pubic and axillary hair.

At puberty, an even larger quantity of female sex hormone is thus produced resulting in a sudden increase in size of the uterus, vagina and breasts and the appearance of the first menstruation.

**DETERMINATION OF ANTERIOR PITUITARY HORMONE**—Aschheim and Zondek (*loc cit*) have formulated a simple test for determining the presence of the hormone, depending on the injection of the substance into immature mice and the subsequent examination of sections of the ovaries for "*Blutpunkte*" or hemorrhages. According to these investigators, the anterior pituitary hormone can be demonstrated in the urine from immediately

after conception to the onset of labor. This reaction has been utilized by Aschheim and Zondek for a biological test of pregnancy

The hormone may also be found in the decidua of the first 4 months of gestation, in the corpus luteum of pregnancy, the placenta, umbilical cord and in the maternal blood serum after the second month of gestation

**THERAPEUTICS**—Numerous attempts have been made to obtain an active preparation of anterior pituitary hormone for clinical use. Zondek and Biedl and Siebke have obtained an active product from the urine of pregnant patients, while T. J. Putnam, H. M. Teel and E. B. Benedict (*Am. J. Physiol.* 84: 157 (Feb.) 1928) have prepared a potent extract from the gland itself. According to Frank, however, all anterior lobe preparations, at present on the market or obtainable for experimental purposes, have proved inert. Preliminary reports lead one to hope that an active therapeutic preparation in the near future will be available.

In the human female, the injection of such preparations results in marked congestion of the pelvic organs, an increase in the temperature of the vagina and rectum and a stimulation of ovulation. Uterine bleeding has been effected in patients who had experienced prolonged amenorrhea, but its true significance is so far unknown, as the bleeding may be only a metrorrhagia due to intense pelvic congestion.

J. B. Collip and A. D. Campbell (*Canad. M. A. J.* 22: 212 (Feb.) 1930) published a preliminary report of their work on the preparation of a standardized placental extract, capable of influencing the ovarian func-

tion in a definite degree. This extract, free from protein, salt, lipid and estrin, may be administered in the form of an aqueous solution either subcutaneously or orally. The concentration and purification of this active principle have been developed by means of fractionation processes to the point where 1 rat unit may be represented by 0.01 mgm. of dry substance. Certain micro-crystalline fractions of great potency have been obtained by these workers, but they are unable to state, as yet, whether such fractions are pure chemicals.

Injection of the active extract into adult castrates over a period of 1 week is without effect. This indicates that the active principle has the specific effect of activating the ovary of an immature rodent but does not affect the spayed animal.

This extract has produced in animals results which suggest its therapeutic application in human beings. On *a priori* grounds one may reason that only those individuals with hypovarian dysfunction may be expected to derive beneficial effects. Three cases of amenorrhea are reported which were treated by the oral administration of the extract, with impressive results. Although the series is small, the tentative conclusions of the authors, with respect to its therapeutic application, point to great possibilities.

**X-RAYS**—X-ray application over the region of the sella turcica in the treatment of gynecological disorders is now a recognized means of therapy. Special indications for its use are functional amenorrhea, dysmenorrhea, certain forms of abnormal bleeding and certain groups of sterility.

Successful results have been obtained in several instances

The future is, indeed, promising for practical therapeutics along scientific lines in a field too often clouded, in the past, with failure

### PLASTIC SURGERY.—SKIN GRAFTING

—Two factors decisive in the success of a transplantation operation are the regenerative power of the tissue transplanted and its individual-differential. The influence of various factors upon the regenerative power of tissue was studied by Fischer (53 Tag deutsch Gesellsch f Chir, Berlin, 1929) who found that transplants in rabbits, when heated to 45° C or cooled to 3° C, soon underwent necrosis, while an increase in temperature to 43° C or a decrease to from 1 to 2° C were well borne by the transplant. If bits of epidermis were kept in an anisotonic solution (*i e*, from one-half to 1 hour in a 3 to 5 per cent salt solution or in distilled water), the individual-differential underwent a change, and the transplant could no longer be endured by the body as a homologous substance, but was destroyed in from three to four weeks.

The researches of G. Lenart and J. König (Klin Wchnschr 7:549 (Mar 18) 1928) showed that the tissue juice contained isoagglutinins belonging in the same group as those found in the serum. They consider that the best conditions for success of transplantation will be found where the blood, or the tissue juice of the donor, agrees with that of the patient.

Sensitizing rabbits by 7 or 8 injections of horse serum and later applying autoplasmic grafts, F. Paolucci (Ann. ital di chir. 8:264 (Mar)

1929) found that the grafts then underwent necrosis in from 4 to 6 days, indicating that the survival of autoplasmic grafts was markedly reduced, the grafts behaving like foreign tissue rather than homologous tissue. The result may have been due to an organic reaction of the anaphylactic type determined by the serum treatment (specific antibodies) or by the absorption of denatured proteins from the zone of necrosis by the Arthus phenomenon (specific antibodies).

Gohrbandt (52 Tag d deutsch Gesellsch f Chir, Berlin, 1928) has demonstrated the intracutaneous course of the vessels by injection preparations of the skin, and has reached the conclusion that flaps for transplantation should be 2 or 3 mm thick, or somewhat thicker than Thiersch grafts but thinner than Krause grafts. Thiersch grafts include only the superficial vessels, whereas Krause grafts go below the deep intracutaneous vessels. Gohrbandt's technic opens the deep intracutaneous vessels and is followed by better healing of the flap, and the transplanted skin seems to have a better and more normal appearance. In 40 such operations there was only 1 instance of a partial necrosis. The flap, however, must not be too large. Kirschner, in discussing this report, stated that he had recommended flaps of this type in his textbook. The knife should be moistened with oil instead of saline solution, and when the incision is made the skin should be stretched transversely. Joseph also uses flaps of the thickness suggested, removed by the Schepelmann knife, while Payr uses the knife advised by Hoffmann of the Graz clinic.

The technic of grafting the small deep skin graft is described by J. S. Davis (Ann Surg 89 902 (June) 1929). This graft differs from the Reverdin graft in that it is thicker. At its center it is a full-thickness graft, but the margins are very thin. Such grafts are ordinarily used on granulating surfaces, preferably those that will later be covered by the clothing. The granulations should be healthy, rose-pink, firm, and not exuberant. Twenty-four hours before the grafting a careful toilet of the area is made, and the granulations covered with a pad saturated with normal salt solution which is allowed to dry. Just before the operation, it is soaked again and removed. The surface is then washed with ether and salt solution and covered with a dry pad which is not removed until just before the application of the grafts. The grafts are usually cut under local or block anesthesia. A bit of the epidermis is picked up on an intestinal needle so that a little cone is formed. The base of the cone is then cut through with the knife edge tilted slightly downward. The grafts are round or oval and from 0.4 to 0.5 cm. in diameter. A narrow rim of undisturbed epithelium is left between the pits made by the cutting of the grafts. The grafts are transferred directly to the surface to be grafted or are placed on a dry towel from which they are picked up by an assistant. They are placed in rows, about 0.5 cm. apart, and covered with perforated rubber protective, then flattened out by firm pressure with a gauze pad, and dried with warm air. Pressure is maintained by dressing with a sea sponge and adhesive. The grafted area is

first dressed at the end of 24 hours and thereafter daily. Grafts that are going to live are a dusky pink at first. Small deep grafts stimulate the epithelial growth markedly and are uniformly satisfactory if the wound has been properly prepared and the grafts have been properly cut and applied. They cause stable healing with pliable and movable scars, but the cosmetic effect is poor.

While *homotransplants*, or those taken from another person, cannot be depended upon for permanency, as a temporary protective covering, Stabel believes they may be of value. As in the case of a small child with a severe **burn**, whom he was able to bring through the most dangerous period and save his life by the use of skin transplants from the patient's brother.

*Visor flaps* from the chest to replace the skin of the anterior surface of the neck and chin in the correction of unsightly deformities from **burns**, **injuries**, or **tumors** have been used by L. Freeman (Ann Surg 87 364 (Mar.) 1928). In 4 cases he has employed a visor flap from the upper thoracic region with pedicles attached to the sides of the neck in the vicinity of the ears. The cicatrix is first removed down to the healthy tissues, regardless of the size of the wound that is produced. The lip and chin are brought up to where they belong, so that there is no tension when the head is thrown back. A flap of the proper size to cover the raw area is outlined, the lower margins of which curve upward on each side of the neck toward the ears and are far enough from the denuded area to provide pedicles an inch or more in width. The chest incision should

curve downward into more or less of a tongue to facilitate closure of the chest wound. After sliding the flap in place, the raw surfaces caused by the lifting of the flap can usually be covered by extensive undermining of the adjacent skin, using stay sutures passed through large buttons. Areas that cannot be completely covered may be skin grafted or allowed to cicatrize, the scar being removed later by the multiple-stage method of Sistrunk.

Meyer, of Goettingen, finds that, in the first stage, the grafting of the reverse side of pedicles of all long pedicle flaps with Thiersch grafts gives better nutrition, avoids infection and shrinkage, and often is of great advantage.

**PEDICLE FLAPS FROM THE SCALP**—To cover the denuded area of skull after the transplantation of a pedicle flap to the face, A. J. Aspinall (*J. Coll. Surgeons Australasia* 1: 230 (Nov.) 1928) immediately takes a flap of skin from the abdomen, removes all fat, cuts the skin into small pieces and presses them firmly over the denuded area of the skull.

W. W. Babcock (*S. Clin. North America* 8: 773 (Aug.) 1928) also has shown the feasibility of using Thiersch grafts directly upon the bone of the skull, even though, through exposure, the bone has been dry for several days. In the latter case, a thin scale of the dry bone is removed with a sharp chisel till fine bleeding points appear, and the thin Thiersch grafts are applied as in ordinary skin grafting. An illustration is given of a patient on whom the method was successfully used in 1925.

**CHEILOPLASTY.**—F. von Czeyda-Pommersheim (*Zentralbl. f. Chir.* 56: 2381 (Sept. 21) 1929) advocates cheiloplasty by double skin flap. Two full depth skin flaps are raised from the outer surface of the upper arm in such a manner that the raw surfaces of the flaps can be placed in apposition and sutured. One of the sutured edges will later serve as the covering for the free margin of the lip. After the flaps have healed, they are transplanted to the lip by the so-called Italian method. The procedure he believes obviates shrinking of the flap.

**TRANSPLANTATION OF FASCIA.**—D. Maluschew (*Zentralbl. f. Chir.* 56: 1422 (June 8) 1929) raises a free flap of fascia lata from the thigh in the usual manner, but instead of placing it in a saline solution he replaces the flap in the wound and sutures the edges of the wound over the flap. When he is ready to use the flap he withdraws it from its bed by means of sutures previously placed in the lower edge of the flap. Thus the flap is protected and the danger of infection and injury is reduced.

**DEAD (PRESERVED) FASCIAL GRAFTS**—When living fascial grafts are implanted, A. R. Koontz (*J. A. M. A.* 89: 1230 (Oct. 8) 1927) found (1) the attachment of the tissue to that of the host to be by the ingrowth of fibroblasts, (2) the development of a new vascular network, and (3) the rehabilitation of the cells. In dead tendon grafts the first 2 phenomena were the same, but in the third stage the dead cells were carried away and replaced by living cells from the host, the final results being identical. Koontz, therefore, con-



cluded that since dead tendon grafts could be used, grafts of dead fascia also were possible and might be of value in the repair of such large ventral and inguinal hernias in which it is difficult to find enough fascia for the repair surrounding the defect. In 17 cases of hernia, he sutured with alcohol-preserved strips of fascia lata of the ox. The experimental and clinical results obtained with grafts of dead fascia suggested that this material might also be used for strengthening the capsules of relaxed joints, the bridging of tendon defects, and the operative cure of aneurysm.

Later (South M J 22 417 (May) 1929), Koontz successfully used alcohol-preserved fascia to repair defects in the stomach and bladder, and to reinforce suture lines at anastomotic points in the intestine. Digestion of the graft in the stomach was prevented by giving bismuth subnitrate by mouth.

**FREE-FAT TRANSPLANTATION** was used in experiments on dogs and rabbits to determine the hemostatic properties of the tissue in hemorrhage of such organs as the kidney, liver, or spleen. After the transplantation, the differentiated fatty tissue was destroyed, but a later restoration of the old normal structure of fatty tissue takes place. The author believes that clinical failures in the transplantation of fatty tissue are due to technical errors in the operation, or to the absence of indications for the procedure.

**TENOPLASTY ON THE THUMB.**—In a case of loss of opposition of the thumb from poliomyelitis N Silfverskiöld (Acta chir. Scandinav. 64 227 (Nov 22) 1928)

obtained excellent opposition after tenotomy of the tendon of the flexor pollicis longus on a level with the sesamoid bones, fixation in slight flexion of the distal part of the tendon at the radial sesamoid, and transplantation of the proximal part of the tendon to the radial sesamoid and the radial border of the first metacarpal, so that it passed from the canalis carpi close to the opponens muscle and thus parallel with and on the same level as the direction of its fibers and force. In a case of ulnar paralysis, the author transplanted with good result the distal tendons of the sublimis muscle to the dorsal aponeurosis just distal to the metacarpophalangeal articulation.

#### **SUBSTITUTION OF THUMB.**

—J L Joyce (Brit J Surg. 16 362 (Jan) 1929) reports 2 cases in which he substituted a ring finger of the opposite hand for a thumb lost as a result of injury or disease. Ten years have elapsed since the finger was transplanted in the first case, and another operation of the same kind has been performed recently. The new thumbs have stood the test of time.

**RHINOPLASTY**—In the method described by E Dujardin (Lancet 1 1280 (June 23) 1928), a triangular double piece of the lobus auriculi is applied so as to form 1 side of the nose and the outside wall of the nostril.

**PROSTHESIS FOR RECONSTRUCTION OF NOSE, EAR, ETC**—F L Lederer (Arch Otolaryng 8 531 (Nov) 1928) calls attention to the unsatisfactory results of plastic operations done to restore malformed or lost parts of the ear and nose, and reports his work to supply these de-

fects with a prosthesis made with gelatin, glycerin, and zinc oxide

**CARTILAGE**—In experimenting upon rabbits, K Reschke (Beitr z klin Chir 146 713 (June 12) 1929) found it possible to transplant pedicle flaps containing the cartilage of the symphysis, and found that a period of 4 weeks was the proper time to elapse before severing the pedicle

**TIBIAL GRAFTS**—F A Hadley (J Coll Surgeons, Australasia 1 208 (Nov ) 1928) reports on 42 cases in which tibial grafts were used to fill gaps in the skull It is now 10 years since the operations were performed One death directly attributable to the operation, occurred on the tenth day The brain had been much injured A high temperature occurred on the eighth day, and the patient became comatose Four other patients have died since—one, 1 year, the others, 3 years after operation Hemorrhage into the brain about a foreign body was the cause in 2 that were examined post mortem Sequestrums, mostly as flakes the size of a shilling or less, formed and were cast off in 5 cases They did not affect the final result Two, possibly 3, patients have since been operated on through the graft A chisel had to be used when the graft was pried off The biggest gap was 12.5 by 7.25 cm (5 by 3 in ) The end results obtained in this series are shown by the following analysis In 36 cases the members of a board have remarked that the graft was firm, the report of 1 post-mortem examination indicates that the graft was hardly distinguishable Thirty-three patients are reported as working, the occupations ranging from full farming to acting as usher at a theater

**PLEURISY.**—A most common type of pleurisy with which the general practitioner is confronted is frequently known as an *idiopathic form* M Hautemann (Ztschr f Tuberk 52 483 (Jan ) 1929) records his observations on 250 cases admitted to the Neukolin Hospital for a period of 7 years Of these, 80 cases were regarded as of tuberculous origin, while a careful examination revealed that only 45 of the cases could be found with no obvious signs of tuberculosis In following up these cases, 15 could not be traced, 10 had developed rapidly progressive pulmonary tuberculosis from which 3 had died, while the remaining 20 were in excellent health The author comes to the conclusion that in two-thirds of all cases of so-called idiopathic pleurisy, this symptom is the only manifestation of an otherwise latent tuberculosis, and the favorable prognosis of the condition is due to the immunizing and bactericidal properties of the pleural effusion

L Morquio (Arch españ de pediat 13 65 (Feb ) 1929) studying *hemorrhagic pleurisy in children* reports 6 cases One of these children recovered, while 3 improved considerably and 2 died The first cases appeared in the third week of typhoid, while the second appeared as a complication of active pulmonary tuberculosis The third developed 3 weeks following an abdominal operation The fourth was of a tuberculous nature and the fifth of a neoplastic nature, while the sixth case followed a fall

According to H Knauer (Ztschr f Tuberk 50 403 (May) 1928), *tuberculous pleurisy in children* is very rare as compared with adults It comprised only one-fifth of all the cases

of exudative disease of the pleura. In children the onset may be acute or subacute with high fever. A sterile serous fluid in a tuberculin-positive child is very suggestive of tuberculous pleurisy. A low leukocyte count with a relative lymphocytosis is quite suggestive. A peculiar form which frequently goes unrecognized is an accumulation of fluid within the mediastinal or interlobar spaces. The x-ray examination is very difficult to associate with the physical findings in such cases.

**PROGNOSIS**—Regarding the prognosis of *pleurisy with effusion*, F. W. Gaarde (J. A. M. A. 95:249 (July 26) 1930) believes that if a patient survives the first and original acute attack of pleurisy, there is a good chance for complete recovery. If he survives the first 3 and possibly 5 years, he has an excellent chance for recovery. Naturally, a positive guinea pig test carried a more grave prognosis in his series. In these cases of so-called idiopathic pleurisy, Gaarde believes they should be treated as tuberculosis, with months of rigid *rest* and that the patient should not be allowed to return to work as soon as the acute symptoms have subsided and passed. With this policy, the prognosis will be much more favorable.

**TREATMENT**—In these cases E. Fischensohn (Arch. i. klin. Chir. 154:565 (Feb. 14) 1929) advocates **pleurotomy**. Under local anesthesia the acquired amount of rib is resected, the pleura incised, and the exudate removed. The result has been entirely satisfactory in the 6 cases treated by this method. The fistula healed well and the patients were able to return to their usual occupations.

He believes the operation is free from danger and within a few days the patients feel better, the temperature falls to normal, respiration is free, the pulse rate is normal, the appetite improves and the cough and pain disappear.

F. S. Bullock (Am. Rev. Tuberc. 19:90 (Jan.) 1929) introduced air or gas into the pleural cavity and stopped both the signs and the symptoms. In some instances the **artificial pneumothorax** was continued indefinitely and in others only temporarily. No untoward effects were observed and it never failed to relieve the pain.

In the treatment of *suppurative pleurisy* there has been considerable change of opinion. According to A. Basset (Arch. med.-chir. de l'appar. respir. 2:535, 1927), up to the time of the great influenza epidemic of 1918, it was considered proper that **operation** on cases of purulent pleurisy should be done as soon as the diagnosis was made. The mortality during this epidemic was so great that a change in plan was necessary. There is an exception still to be considered and that is in the case of putrid and gangrenous pleurisy which must be operated upon immediately.

It seems more dangerous to operate immediately in the other cases, rather than to wait until the acute pulmonary condition has subsided. In these cases **medical treatment**, supplemented by a **vaccine** or **serum therapy** and **puncture**, should be given until the acute pulmonary stage has passed. Then, and only then, does the author believe it is time to **resect** a piece of the rib under local anesthesia and evacuate the pus. If a pouch develops below the first resection, it may be necessary to repeat the operation. To

prevent the occurrence of an osteitis of the ribs, the author advocates covering the freshly exposed ribs by the adjoining soft parts

In *children*, *pneumococcus pleurisy* is relatively benign and seldom requires surgery, unless medical treatment fails. In mild cases with slight effusion, there is a spontaneous absorption of the fluid, but when it reforms following repeated punctures, a resection may be necessary

**PNEUMONIA.—EPIDEMIOLOGY**—The epidemiology of pneumonia is considered by J P Powell, R M Atwater and L D Felton (Am J Hyg 6 570 (July) 1926) who found that half of the 93 persons examined repeatedly for 7 months were carriers at some time of a fixed type of pneumococcus. None of the fixed-type carriers had clinical pneumonia during the period of observation. Fixed-type organisms tend to disappear from the respiratory tract in less than 30 days. Those in contact with cases of pneumonia are likely to carry a virulent fixed type. Carriers of pathogenic organisms are so widespread that isolation is only partly effective. In general, it would seem the disease pneumonia occurs when there is a coincidence between infection with a pathogenic form of pneumococcus and a lack of resistance in the same individual

The virulence of pneumococci is graded by C H Whittle (Brit M J 2 134 (July 23) 1927) as corresponding to different forms of disease of the lung. These grades correspond quite constantly to different forms of disease in the lung. The highest grade is associated with the most acute, the most clearly defined, and

the most fatal form of pneumococcal infection of the lung, *lobar pneumonia*. The next grade, only slightly lower, is associated with *bronchopneumonia*, a less acute, less regular, and less fatal type. Empyema, which may result from a lobar or bronchopneumonic type of lesion, corresponds to a range of virulence covered by both types

**ETIOLOGY.**—Pneumococci may therefore be divided into at least 2 groups by virtue of their pathogenic power, those of high virulence setting up well recognized clinical entities like *lobar* and *bronchopneumonia*, and those of low virulence which are associated with minor illnesses or in debilitated individuals. The American classification into 4 types, according to their serum reactions, is of no value for determining the pathogenicity of a strain

In a series of 522 cases of *lobar pneumonia* analyzed by F D Adams (New England J Med 199 402 (Aug 30) 1928), pneumococcus type 1 and group 4 were the common etiological factors. Pneumococcus type 3 gave the highest mortality rate. A positive blood culture is a sign of severe infection, and the later the blood culture is found positive, the graver the outlook. Save in the mild or atypical cases, a low leukocyte count is an unfavorable sign. Upper lobe involvement, is more dangerous than lower lobe involvement, while patients with involvement of more than 1 lobe have the highest death rate. *Empyema* is by far the commonest and most important complication. It is often not recognized because of the frequency with which the so-called typical signs of fluid are not

present. Exploration for pus in a suspected case is usually best delayed until the patient has recovered from the severe toxemia which accompanies the pneumonic infection.

**PATHOLOGY.**—J. F. Gaskell (Lancet 2 951 (Nov 5) 1927) states that the estimation of the virulence titre is of utmost importance in pneumonia. The higher the titre of the organism, the more severe the lesion produced.

The size of the affected lobes in *lobar pneumonia* is smaller than the normal lobes, according to P. N. Coryllos and G. L. Birnbaum (Am J M Sc 178 15 (July) 1929). The enlargement of the consolidated lung is only apparent and is due to the collapse of the healthy lung when the thoracic cavity is opened. In order to appreciate the true sizes of the consolidated and healthy lobes it is necessary to clamp the trachea and then to open the chest with only the minimum manipulation of the healthy lobes. The decreased size of the pneumonic lobe, as shown by roentgenologic and post-mortem studies, points to a similar pathogenesis in *pneumonia* and *atelectasis*. These points being definitely proved for the dog, need further confirmation for the human being.

Kidney involvement of any severity is rare in pneumonia, states A. V. Neale (Brit M J 2 891 (Nov 17) 1928). A study of 287 cases of *acute lobar pneumonia* with reference to nephritis leads him to conclude the *pneumococcus* is a benign organism in relation to the etiology of nephritis.

The blood serum was found by R. H. P. Sia, O. H. Robertson and S. T. Woo (J. Exper Med 48 513 (Oct) 1928) to acquire constantly the prop-

erty of promoting pneumococcus killing to a relatively marked degree at the time of crisis or lysis. Other evidences of antipneumococcus reaction, mouse protection, opsonins and agglutinins, were also demonstrable in the blood at this time. These immune changes appeared in the majority of cases at the beginning of recovery and failed to occur when the disease terminated fatally.

According to the conception of pneumonia presented by P. N. Coryllos and G. L. Birnbaum (Arch Surg 18 190 (Jan, pt 2) 1929) based on experimental and clinical data, *lobar pneumonia* is considered as an "infectious (generally pneumococcal) *lobar atelectasis of the lung*". *Post-operative massive atelectasis*, *post-operative pneumonia* and "*lobar pneumonia*" are shown to have a similar pathogenesis and evolution, and similar clinical and x-ray signs. *Bronchopneumonia* is considered as an infectious patchy atelectasis. **Bronchoscopic treatment**, which has given such encouraging results in massive atelectasis, has been suggested and applied to cases of *lobar pneumonia* in man. The number of these cases is as yet too small to allow definite conclusions to be drawn from them.

Bronchoscopic treatment of patients with *lobar pneumonia* has been done by P. N. Coryllos (Am J M Sc 178 8 (July) 1929) in 9 cases, proving that there is occlusion to the air of the bronchus corresponding to the consolidated area in *human lobar pneumonia*, and the innocuousness of a correctly performed bronchoscopy in cases of pneumonia.

**DIAGNOSIS.**—The sedimentation rate is accelerated constantly in pneumonia and bears no relation to the

pneumonic process, state M Tapia and J Torres (Arch de med, cir y espec 27 569 (Nov 12) 1927) However, the sedimentation time is of diagnostic value, especially with morphological examination of the blood where physical signs are not sufficient to make a diagnosis

**CRISIS**—A Cannon (Brit M J 1 661 (Apr 21) 1928) states that the pneumococci produce **oxygen** which acts favorably on its growth, but when the oxygen is set free in excess, the organisms die, producing the crisis

**COMPLICATIONS**—The probable complications of pneumonia as found in 12,000 autopsies by J Z S Cruz (J Philippine Islands M A 7 162 (May) 1927) are *abscess* and *gangrene of the lung*, *emphysema*, *fibrinous pericarditis*, *meningitis* and *thrombosis* Myocardial weakness was the cause of death in most cases

*Unresolved pneumonia*, states O C Pickhardt (Arch Surg 16 192 (Jan, pt 2) 1928) was found to be present in only 6 out of 52 cases referred for x-ray examination with that diagnosis

All cases of non-resolution should have a Wassermann reaction done on them, states R J Reitzel (South M J 21 469 (June) 1928) and antisyphilitic treatment instituted if syphilis is present

*Icterus index studies in lobar pneumonia* by N W Elton (New England J Med 201 611 (Sept 26) 1929) showed a rising curve when the pathologic changes were purely intra-alveolar The highest icterus indices were found in cases having a true crisis When a pleural exudate of the serofibrinous or seropurulent type developed, enough to be demonstrable by x-rays, or was found at necropsy, a

precipitous drop of the icterus index invariably signaled its onset, in cases having had a definite initial rise The phenomenon of *bile solubility*, as well as the presence of *specific antibodies*, may contribute toward producing the dramatic phenomenon of the crisis

**TREATMENT**—For the prevention and treatment of pneumonia Sir James Barr (Practitioner 121 69 (Feb), 189 (Mar) 1928), suggests the following routine in the early stages, give a **hot mustard bath**, **rub the chest with a coarse towel** to excite the pulmonic reflex of dilatation, or apply a **mustard poultice** to the part which is not expanding well The patient should be put to bed, given a **bowl of gruel**, or a glass of **punch** made with **rum** or **whisky** After this there should be **no more food for 24 hours**, except **hot water** or **milk and hot water** The author advises elimination by bowel, with a dose of **calomel** and a **saline** For rest, he gives 15 grains (0.06 to 1 Gm) of Dover's powder

A physiological and supportive treatment of pneumonia is recommended by E E Cornwall (M J and Rec 129 661 (June 19) 1929) which is essentially as follows (1) Keep the patient in bed in a horizontal position, but he should be allowed to assume the position most comfortable, consistent with the horizontal position, (2) protect the patient from chilling, (3) a diet to supply daily, for example, 38 Gm protein, 90 ounces of water and 1200 calories The articles of food are modified milk, cereals, gruels, strained fresh fruit juice, lactose and dextrose, salts and water, (4) a conservative policy in regard to artificial evacuation of the bowels is essential If the disease is

in an early stage, an enema is given. After that, the bowels are not moved during the active period of the disease, unless special indications, such as tympanites or an uncomfortable sensation in the rectum occur. If necessary, enemas, rather than cathartics are used, (5) circulatory supportive treatment is used when necessary, the drugs most commonly used being **strychnine, caffeine, morphine, alcohol, strophanthin** and occasionally **digitalis**, (6) complications are treated cautiously and conservatively as they arise.

**Suprarenal extract**, mixed with **physiological sodium chloride solution** by **intravenous drop infusion** continued for days has given good results according to H. Schottmüller (Deutsche med. Wchnschr. 54 1538 (Sept. 14) 1928). If symptoms of overdose appear, the number of drops per minute may be diminished by compressing the tube.

**Morphine** causes a reduction in the respiratory rate, tidal air and minute volume of ventilation as shown by J. S. Davis Jr. (J. Clin. Investigation 6 187 (Oct. 20) 1928) in a study of 15 cases of pneumonia. In the presence of an extensive pulmonary involvement with diffuse moist râles, the administration of morphine may result in a dangerous degree of anoxemia.

**Bile salts** exhibiting *bacteriolytic* and *inactivating effects* on virulent pneumococci *in vitro*, led A. Castellanos y Gonzalez (Arch. de méd. d. enf. 32 141 (Mar.) 1929) to use solutions of these salts in the treatment of pneumococcus infections. In empyema without pleural adhesions, he used **intrapleural injections of a 5 per cent solution of sodium taurocholate**, com-

binning this treatment with **sero-therapy** and **vaccine therapy**.

**Mercurochrome, horse serum** and a mixture of the two have been used by J. H. Hill and M. G. Ellis (Bull. Johns Hopkins Hosp. 44 40 (Jan.) 1929) in the treatment of white mice inoculated with pneumococcus cultures. Mice treated with mixtures of mercurochrome and serum showed a markedly favorable therapeutic response as compared with mice receiving either drug or serum alone. The therapeutic action shown by mercurochrome and by normal horse serum separately and by the mixture is unrelated to direct germicidal action, as evidenced by the failure of *in vitro* mixtures of culture dilutions with these substances to show any diminution in virulence.

**Serum treatment** in Type I *lobar pneumonia* has been used by R. Cole (J. A. M. A. 93 741 (Sept. 7) 1929) since 1913. Type II serum was also tested in a few cases, but experimental and clinical observations soon showed that serum treatment in pneumonia, if successful at all, was most likely to be efficacious in Type I cases. Treatment was commenced in 1913, and of 1256 cases of lobar pneumonia, 431 were definitely determined as due to Type I pneumococci. Of these, 44 patients died, a mortality rate of 10.2 per cent. If 60 cases with 5 deaths in which the serum was not administered are omitted, the corrected figures become 371 patients who received the serum, 37 deaths, and a mortality rate of 10.5 per cent. This low mortality was not due to slight severity of the disease or to early hospitalization. Positive blood cultures in 32 per cent showed that the cases were at least of average severity, and the date of ad-

mission to hospital in 30 per cent of the cases was the fourth day of the disease or later. The average time of commencing treatment was 42 days after onset in the patients who recovered, and 52 days in the fatal cases. Early treatment cannot be the sole factor in the favorable results, and Cole regards as equally important, the use of a good serum of a high titre in large amounts, and constant supervision of the patient.

Evidence is submitted by R. L. Cecil (Arch Int Med 41:295 (Mar) 1928) that antipneumococcus serum and its derivatives, when administered under the proper conditions, are capable of exerting a definite influence on the course of pneumococcus Type I and Type II pneumonia. A specific therapy for these 2 types of pneumonia is, therefore, theoretically sound. The practical application of the specific treatment of pneumonia is still handicapped, however, by certain defects in the serum itself or in the derivatives from it. Whatever the serum or serum derivatives used, the necessity of early and adequate treatment cannot be too strongly emphasized. The value of large doses of serum is stressed.

**Vaccine treatment** in *acute pneumonia* has been used with good results by W. H. Wynn (Brit M J 2:480 (Sept 17) 1927), who states that in pneumonia the curve of intoxication probably rises rapidly and then remains fairly steady corresponding roughly with the temperature chart. At first, antibodies are absent, but about the fourth day they begin to be present, the rise of their curve is at first slow, then rapid, and about the end of the week the antibody curve overtakes the curve of intoxi-

cation and a crisis occurs. The problem is to produce an early rise in the antibodies while the curve of intoxication is still ascending and easy to overtake, and before the toxins are fixed in dangerous amount in the nerve and heart cells. There is an interval in which the patient is unsensitized, and it is found that if during that interval we inject an adequate amount of a suitable vaccine, we can to a large extent control the infection. The earlier the injection, the more successful the results should be.

For *acute lobar pneumonia*, the author uses a **stock vaccine** of pneumococci made from primary growths under 24 hours old. For an adult, at least 100 millions should be injected, for a child of 12 half the dose, and a child of 3 or 4, a quarter. As the majority of cases are *bronchopneumonias of mixed infection*, the author uses a **vaccine containing equal parts of pneumococci, streptococci and *Bacillus influenzae***, 100 million of each. The plan is "to strike early and strike hard."

In *pneumococcus infection*, K. Goodner (J Exper Med 48:1 (July 1) 1928) asserts that within 5 days after a single vaccination with dead pneumococci the normal rabbit develops an immunity to infection. If the rabbit is vaccinated and then infected within the period necessary for the development of this immunity, the course of the consequent disease is shortened in proportion to the interval between vaccination and infection.

**Quinine injections** in *lobar pneumonia* have been used by L. H. Van der Velde (Nederl Tijdschr v Geneesk 1:821 (Feb. 16) 1929). Intragluteal injections of **quinine hydrochloride**, 500 mg, combined with urethane to avoid pain, are used. He re-



ports a fall in death rate from 25 per cent to 5 or 6 per cent

**Ethylhydrocupreine** or **optochin** in doses of 4 grains (0.24 Gm) every 4 or 5 hours for 15 doses has given good results as stated by F B Cross (M J and Rec 126 271 and 354 (Sept 7 and 21) 1927) The patients are put on a milk diet and all medications by mouth are discontinued The results in 3008 cases with a death rate of 5.08 per cent, were encouraging

**Potassium permanganate** in the treatment of pneumonia has been used by J L Chester (Ann Int Med 2 1175 (May) 1929) with good results He used the standard solution, 2 grains (0.13 Gm) of permanganate to 1½ pints of warm sterile water, injected rectally by means of a funnel and catheter, the patient lying on his left side, and with the intention of the fluid being retained The initial injection was 4 ounces (120 cc), repeated every three hours Of 23 patients treated under ideal conditions, 21 recovered and 2 died Of 20 cases, all severe and all complicated, some showing chronic heart conditions of long standing, and nearly all chronic alcoholism, 10 were treated by other than the potassium permanganate method, and in all death occurred The remaining 10 patients received the standard solution of the drug Five patients in well nigh hopeless condition recovered

**Oxygen Therapy in Pneumonia**—D A Prendergast (Canad M A J 18 49 (Jan) 1928) urges that oxygen treatment should be started early in cases of pneumonia before the anoxemia, which frequently occurs in severe cases, has injured the central nervous system It should be administered efficiently The method in

most common use, a tube connecting an oxygen tank with a funnel held loosely over the patient's face, the author considers the most inefficient. Three other methods are mentioned, the oxygen chamber, the Haldane mask, and the nasal tube. Both of the first 2 are very efficient, but have serious disadvantages The nasal tube he considers best for general use This consists of a tube leading from the oxygen tank and ending in a soft rubber catheter, which after being lubricated, is passed back through the nostril to within half an inch of the posterior wall of the nasopharynx, where it is secured by a strip of adhesive tape It is an improvement to bubble the oxygen through hot water on its way to the patient, thus warming the gas and saturating it with water vapor The oxygen is thus delivered at the point where the nose and mouth meet, so it does not matter whether the patient breathes through his nose or his mouth, he receives the oxygen just the same The most common fault with this method is that the amount of oxygen delivered is too small, often less than half a liter of oxygen a minute when about 4 liters a minute are indicated Therefore, the easiest way is to have as high a rate of flow of oxygen as the patient can bear

There appears to be a positive correlation between anoxemia and mortality as stated by C A L Binger (J Clin Investigation 6 203 (Oct 20) 1928) Moreover, the level of oxygen saturation in the arterial blood of a patient exposed to 40 per cent oxygen is of prognostic importance, since the survivors usually reach a level above 90 per cent, while the fatal cases do so far less often In a small

group of cases selected because of severe anoxemia (oxygen saturation below 60 per cent) Binger has considered the physical signs and autopsy observations in relation to the arterial oxygen saturation. The presence of extensive, rapidly spreading pulmonary lesions with much moisture, exudate or transudate appears to be common to this group. In what manner this type of lesion brings about anoxemia he is not yet certain. It is in part due to diminished lung volume, in part due to passage of blood through unaerated channels. Such a shunt of blood need not imply a completely consolidated lobe, but may result from the collection of intra-alveolar exudate. The degree of interference with oxygenation as well as the response to oxygen inhalation will depend both on the amount and on the character of the exudate. The thin, watery transudate of pulmonary edema which gives rise to outspoken anoxemia in room air may yield quickly to an increased partial pressure of oxygen. A thicker plastic exudate, however, may form a fairly effective barrier to the diffusion of oxygen.

**Digitalis in Pneumonia** — W S Burrage and P D White (Am J M Sc 174 260 (Aug) 1927) report that in a group of 221 unselected cases of *lobar pneumonia* in adults, approximately one-half received digitalis medication in varying amounts, the other half, none at all. Those who received digitalis showed a mortality  $2\frac{1}{2}$  times that of those who received none. The patients receiving digitalis were divided into those who were digitalized and those who were not. The digitalized patients showed a mortality only five-eighths

( $\frac{5}{8}$ ) as high as those who were given no digitalis medication whatever. Those receiving non-digitalizing doses showed a mortality  $3\frac{1}{2}$  times as high as those without any digitalis. In the undigitalized group, digitalis was administered unsystematically in many instances, being used as a last resort in about one-half of the cases at a time when they were very seriously ill. In the groups here considered, among which the percentages of complications and danger list patients is very similar, the lowest percentage of mortality was found in those patients who were digitalized, and next in those who received no digitalis. The definitely higher mortality among those cases receiving non-digitalizing doses should discourage this type of administration. *If the drug is to be used, full digitalization should be accomplished.* It appears that the systematic administration of digitalis in digitalizing doses may have been of benefit in this series of cases. No untoward effects from a toxic action of digitalis in the present series of cases were observed.

On the assumption that failure of the heart muscle is a fundamental cause of mortality from pneumonia, there has grown up a therapy that is widely practiced in the United States, namely, the routine administration of digitalis. B M Randolph (Arch Int Med 43 249 (Feb) 1929), believes that the routine treatment with digitalis for pneumonia is ineffective, that not infrequently it is injurious, and that it is based on a failure to grasp the important factors in the pathologic physiology of the disease. He analyzes 100 cases, working on the hypothesis that the circulatory failure occurring in pneumonia is pri-

marily peripheral, and that the myocardial failure is secondary. Randolph has made some observations of the behavior of patients in whom the therapy was directed toward sustaining the vasomotor tone. **Pituitary extract** was the agent selected. Epinephrine was rejected, partly because its action is too transient, and partly because it increases the contraction of the heart muscle. He believes that something beneficial has been accomplished in some patients. It manifestly does not have a beneficial effect on the toxemia. So far no ill effects have been seen that could be attributed to the drug.

The Rationale of Digitalis Therapy in Pneumonia is the subject under which R. C. Treiman (J. Missouri M. A. 26:335 (July) 1929) presents an excellent review of the literature. The summary of his paper is as follows:

1. The rationale of digitalis therapy in pneumonia cannot be based alone on statistical studies, on clinical impressions or on pharmacological observations. An evaluation of the evidence derived from all 3 avenues of approach is necessary.

2. Clinically, most of the symptoms which could be classified as circulatory, tachycardia, cyanosis, dyspnea and cardiac dilatation are due either to physiological response or to causes other than cardiac.

3. The use of digitalis in pneumonia to lessen tachycardia, to raise a fallen blood-pressure, or to increase the minute volume output of the heart is on a very uncertain basis.

4. The evidence available at present does not justify the routine use of digitalis in pneumonia.

**Diathermy** in the treatment of pneumonia, according to G. Clement

(Arch. Physical Therapy 9:199 (May) 1928), has given very satisfactory results. It maintains the stage of congestion, prevents the morbid process from progressing to the stage of red hepatization or gray hepatization and afterwards relieves the congestion. It favors phagocytosis by hindering bacterial activity. It promotes lung aeration as is proven by the rapidity with which cyanosis disappears. There is a relaxation of the tension on the tissues surrounding the pneumonic solidification. The blood-vessels dilate near to, but not in the inflammatory area. The carrying capacity of the arteries and veins is increased. This means more blood flowing to and from the inflamed part. It results in local heat dispersion and an equalization of the interchange of pressure between the vessels and the surrounding tissue. Consequently, congestion never becomes stasis. Red hepatization never becomes purulent. Redness disappears when congestion ceases. The temperature falls by lysis. Convalescence is markedly shortened. *The effect of diathermy upon the patient's feelings is gratifying.* He is quite promptly relieved of his pain, shortness of breath, cyanosis and restlessness. Tissues outside of the area of inflammation must be included in the region through which the current passes. **High voltage** and comparative **low milliamperage** are used. The treatments are given twice daily and are of 30 to 45 minutes duration. An average of  $6\frac{1}{2}$  treatments per patient are given. The average duration of the treatments is 35 minutes.

Reports from all parts of the country and from abroad show a steady increase in the use of **diathermy** in

pneumonia, according to H. E. Stewart (Arch. Physical Therapy 9 437 (Oct) 1928) After 6 years of experience, the author makes a definite claim for a lessened mortality in treated cases In the average case, he advises treatment every 4 hours, except during the early morning, with electrodes sufficiently large to cover the involved area, anteriorly and posteriorly, at 1400 to 1800 ma At first, caution was advised in cases complicated with empyema, but now Stewart not only continues but intensifies the treatment, once the patient has passed the critical stage of his pneumonia

Diathermy is a distinct and valuable aid in the treatment of pneumonia according to N J Seybold (Ohio State M J 24 210 (Mar) 1928) It can be used in all cases, but is not a specific, and all the other usual measures should be taken

### PNEUMONIA IN CHILDREN

—Displacement of the heart in pneumonia in childhood is discussed by K H Tallerman and M H Jupe (Arch Dis Childhood 4 230 (Aug) 1929), who describes 5 cases in which, during an attack of pneumonia, the heart deviated toward the side of the lesion, subsequently returning slowly to a normal position, as recovery occurred A consideration of these cases, and of other similar cases reported in the literature, points to the fact that this phenomenon is not infrequent in childhood and would in all probability be more often noted if specially looked for by physical examination, and if x-rays of the chest were taken early Displacement of the heart appears to be brought about by the traction exercised by shrinkage, due to partial collapse of the

sound lung, which is frequently distended by compensatory emphysema The authors assert that this cardiac displacement is not caused by a pulling over, due to fibrosis, since it occurs in the acute stage of the disease, and the heart subsequently returns to its normal position Moreover, neither by physical nor by x-ray examination, can evidence of fibrosis be noted

In a clinical series of 648 cases of pneumonia in children from birth to 12 years reported by C McNeil, A R Macgregor and W A Alexander (Arch Dis Childhood 4 270 (Oct) 1929), empyema occurred in 89, a frequency of 1 in 7 The incidence was lower in the earlier age periods and was appreciably higher in later childhood Thus, in the periods from birth to 2 years, and from 2 to 5 years, it was almost equal, 1 in 10, while from 5 to 12 years it was 1 in 5 There were 3 examples of well marked pyopneumothorax in the series For the total, the mortality was 40.5 per cent Up to 2 years of age it was 75 per cent, from 2 to 5 years it was 31.5 per cent, from 5 to 12 years it was 8.5 per cent

A study made by G Manace (Canad M A J 20 609 (June) 1929) of 131 cases of pneumonia in children lends support to the belief that lobar pneumonia is more common in infants than bronchopneumonia (an incidence of from 1.0 to 0.62) A child with a lobar involvement has 4 times as great a chance of surviving as one affected with lobular or bronchopneumonia The general state of nutrition, rather than the specific micro-organism, is probably the deciding factor for the type of pneumonia a child may acquire The healthy and robust youngster is more

likely to develop lobar pneumonia, the undernourished marasmic child usually develops bronchopneumonia. In lobar pneumonia, the right upper and left lower lobes are most frequently involved, with the incidence slightly higher in the right apex, followed by the right lower, left upper and right middle lobes.

**TREATMENT.**—If the child shows restlessness, insomnia and panting respiration, but neither cyanosis nor collapse phenomena, F. Basch (Wien klin Wchnschr 41 1738 (Dec 20) 1928) regards plenty of **fresh cool air** as of great importance in the treatment. The bed should be moved to the open window or an open porch. An infant, if warmly dressed, may be carried around in the garden. The fresh air has a quieting influence, the circulation improves, and the patient is able to sleep. The use of **oxygen inhalations** is also very helpful. Cardiac stimulants should be avoided in these cases. When the child is weak and pale, with shallow respiration and enfeebled heart action followed by cyanosis, it is advisable to administer cardiac stimulants. Digitalis should be avoided in the beginning. To strengthen the heart muscle, intravenous injections of **dextrose solution** are very effective. If the child is suffering from dyspnea and if the heart action becomes very weak, **oxygen and cardiac stimulants** are only temporarily effective. For such cases, the author advises **hot baths** for older children or **mustard applications** for infants. If these are not effective, **venesection** should be done. Cachexia frequently follows resolution of the pneumonia. In such cases the author advises **blood transfusions**. **Quartz lamp treatments**

are effective for the subacute stages of pneumonia. Of great importance also is the nutrition of the child. For infants, an **antidyspeptic diet** should be prescribed, the author gives **buttermilk or albumin milk**. In case of alimentary disturbances, **nutrient sugar solutions** should be given. The diet of older children should include milk, eggs and sugar. To satisfy the craving for **fluids**, sufficient quantities of **water, tea and fruit juices** should be given. Care should be taken that the **air** in the sickroom has a sufficient content of **moisture** and that the patient is always kept in a half sitting position.

**Artificial pneumothorax** has been used successfully in 2 cases by J. Ibrahim and J. Duken (Arch f Kinderh 84 241 (July 20) 1928). They advise that it is to be used when conservative treatment fails, in pneumonia localized on one side, especially when there is danger that bronchiectasis may develop.

**Subcutaneous injection of oxygen** has been used by T. M. Montford (Brit M J 2 757 (Oct 26) 1929) in 179 cases. The area of skin raised from the chest wall by 100 cc of oxygen slowly injected was found to be equal to the area covered by the palm of a man's hand. This rule was fairly accurate and was followed in this series, from 50 to 200 cc being injected at a time. Generally, 2 or more doses were given. Within 4 hours after the injection the temperature, as a rule, fell, sometimes to normal. This was accompanied by a partial fall in the pulse rate. The lowering in the pulse and respiration rates was less obvious than the fall in temperature. Dyspnea was eased. If cyanosis was a feature, within an

hour the color was improved. In no case did a crisis take place, the temperature falling by lysis. The use of subcutaneous oxygen did not have a beneficial influence on the mortality. It was 25 per cent in both treated and non-treated cases. The average length of the febrile stage was shorter in the oxygen group. The average length of the course of the disease was lessened in the oxygen series.

**PNEUMOTHORAX, ARTIFICIAL**, together with phrenicectomy and thoracoplasty, has taken a very important place in the treatment of *pulmonary tuberculosis*. In the United States Veterans' Bureau, P. B. Matz (Am J M Sc 176: 87 (July) 1928) found that of 22,948 patients, 588 received pneumothorax therapy during their hospitalization or 2.5 per cent. Most of the patients were placed on pneumothorax therapy after it was found that they had failed to improve under other methods of treatment. In a number it was used for the purpose of arresting active or recurrent pulmonary hemorrhages, in a small percentage, to obliterate cavities. The majority of the patients had bilateral lung lesions and of these, almost one-half had less than one-third of the better lung involved. The excellent results obtained suggest that bilateral involvement is no counter-indication to pneumothorax therapy, this not concurring with the opinion of many clinicians. The majority of the patients have been between the ages of 26 and 35.

Complete collapse seems to give more satisfactory results than partial collapse therapy and also a smaller mortality. The best results were obtained in patients with bilateral lesions who had less than one-third of the better lung involved. The next best results were seen in patients with unilateral involvement, and the poorest results were obtained in patients with bilateral lesions who had more than one-third of the better lung involved. The mortality of the series was highest in those with basal involvement, the next highest death rate was in the group of bilateral lesions with more than one-third of the better lung involved,

the lowest death rate was among the cases of unilateral involvement, and the next lowest death rate was among those cases of bilateral lesions who had less than one-third of the better lung involved.

In a little less than one-half of the patients there was a decrease in the lesions in a non-compressed lung with improvement in the physical signs. Some of the patients, however, showed no change in the physical signs of an uncompressed lung. In a small percentage, the treatment is accompanied by extension of lesions in the non-compressed lung.

In 22.64 per cent it was necessary to discontinue treatment for various reasons, the principal one being obliteration of the pneumothorax cavity. A second reason was failure of the patient to improve under treatment, and, in about 7 per cent, the death of the patient. Complete collapse has a greater influence on the reduction of temperature than a partial pneumothorax, but this also has a decided effect in reducing temperature.

In 5 cases observed by L. Bernard, L. Baron, F. Triboule and J. Valtis (Presse méd 37: 877 (July 6) 1929), in whom artificial pneumothorax had been continued from 29 months to 6 years, the effect was not satisfactory. It is the author's impression that in a recent unlocalized infection favorable results occur within a short time, while the older the tuberculous lesion, the less the patient may respond to treatment. The site of the lesion which most authors consider very important is given little attention. Pneumothorax should be discontinued by degrees. A safety pocket containing some air, kept open for about a year, is advocated by the authors. They further consider spring or summer most favorable for the suspension of the treatment, since during this time there is the least danger of respiratory infection taking place. During the period of reestablishment of normal function of the lungs, the patient should be under strict observation, preferably in a sanitarium.

*Air embolism* during artificial pneumothorax occurred in 12 out of 819 cases, with 13,935 re-fillings, reported by M. Borock and D. Widré (Beitr z Klin d Tuberk 69: 324 (June) 1928). In 2, the symptoms were severe and in the remainder mild.

There were no deaths. In no case with free pleura and negative terminal pressure was embolism experienced. In 53.7 per cent pneumothorax was complicated by *pleural effusion* but in only 2 cases did an *empyema* develop.

Air embolism in artificial pneumothorax resulting from the point of a needle entering a pulmonary vessel occurs chiefly in a primary pneumothorax and is always fatal, according to Borock and Widre (*ibid*). With proper technic and the continual manometer control, however, it should not occur. Particular manipulations, such as suction with a syringe, or the introduction of a physiological salt solution, must be avoided in the absence of variations in the manometric readings. Embolisms of accidental origin, however, occur from the tear of an adhesive band when the gas sac is already present. These cannot be foreseen or avoided. Embolisms of this origin are not as serious as their consequences. In 12 of 890 cases, although the point of a needle was in the gas sac, embolism developed and adhesions and bands were numerous in every case, despite the fact that the gas sac was of good size.

Bjelke (Tidskr. f. d. Norsk. Lægeforp. 1278 (Nov.) 1927), on investigating the after-history of 111 cases given artificial pneumothorax treatment at the Vensmoen Public Sanitarium during the past 10 years, found that in 41 cases the disease was mainly of an exudative progressive character, 5 patients belonging to the second, and 36 to the third stage of the disease as classified by the Turban-Gerhardt system. Cavities were demonstrable in 31 of these 41 cases, 40 were sputum positive on admission and only 29 on discharge. Twenty-three of these 41 were discharged as improved, 36 subsequently died, and among the 5 survivors, only 1 could claim as long an interval as 3 years between the treatment and the present investigation. In the remaining 70 patients whose disease was mainly of a productive chronic character, the result was very different. There were 36 in the second, and 34 in the third stage of the disease. Cavities were demonstrable in 36, tubercle bacilli were found in the sputum of 69, and on discharge only 18 of the 70 patients were still sputum positive and 65 discharged improving. Studying

their after-histories, 58 were found still alive, only 12 having died.

During the 10 years under review, the choice of patients for this treatment underwent considerable modification. During the first 5 years, i.e., up to 1922, most of the patients suffered from severe disease of the exudative progressive type. During the last 5 years, the patients selected for treatment suffered from the productive, rather than the exudative, type and, of the 63 patients treated during the last 5-year period, as many as 53 were found to be fit for work when the present investigation was made. One patient was unfit for work and 9 died.

The author emphasizes the importance of the surroundings of the patients, being discharged from sanitarium sputum negative, and notes that as many as 109 of the 111 patients had tubercle bacilli of the sputum before a pneumothorax was induced, 72 leaving the sanitarium sputum negative. There was no case of gas embolism in this period.

**Cauterization of adhesions** in artificial pneumothorax was carried out in 100 cases by Matson (Am. Rev. Tuber. (Mar.) 1929), of these, 14 were single-string or band adhesions, 44 multiple strings and bands, and 42 diffuse folds. Ninety-two cases of single cauterization operation were done, 68 successful and 24 unsuccessful. The latter were all cases of diffuse fold type of adhesions. In 4 cases, 2 cauterizations were done, 3 successful and 1 unsuccessful because of the presence of diffuse folds. In 2 cases, 2 cauterizations were performed with successful end-result in each. Two patients were operated on 4 times each, a satisfactory collapse being obtained in 1 and the other experienced improvement, but diffuse folds or adhesions prevented a satisfactory end-result.

A serous exudate was present at the time of operation in 42 cases, but in no instance was the quantity of the fluid large. In the patients with fluids, the reaction to operation did not differ from those without fluids, except that more fluid occurred after operation than in the fluid-free cases. Of 58 patients without fluid before cauterization, 48 developed fluid after the operation, in 28 it was of moderate degree and did not require an aspiration, while in 20, aspiration was done and the treatment carried



out as in the cases in which fluid occurred during the course of pneumothorax. Purulent exudate was present before the operation in 2 cases, but was not aggravated by cauterization.

Sixteen patients developed *empyema*, all being tuberculous, in 3 of these cases tube drainage was resorted to. In 9 the empyema cleared up under oleo-thorax and 4 patients are still under this treatment but are doing satisfactorily. In 7 cases in which caseous tubercles were encountered in adhesions, tuberculous empyema was predicted. As a routine practice in such cases 150 to 250 cc (5 ounces to  $\frac{1}{2}$  pint) of 2½ and 5 per cent cajuput oil preparation is placed in the pneumothorax cavity after cauterization. This, he believes, is useful in preventing disseminated infections.

*Bleeding* to the extent of a few drops is frequently encountered in band and fold type adhesions and either stops spontaneously or is controlled by the cautery. Moderate hemorrhage occurred in 1 case (2 liters—2 quarts), but was easily controlled by cauterization after bleeding points were found. In this case multiple band adhesions were cauterized. No bleeding occurred in any case of string adhesions.

Severe febrile reaction occurred in 5 cases, and in 1 instance *fever* lasted three weeks, in 2 others, less than 10 days. No shock or other serious complications were observed. A slight *subcutaneous emphysema* sometimes occurs, but it is usually the result of uncontrollable cough or light strapping after the operation.

**RESULTS**—In a series of 273 patients (275 subjected to artificial pneumothorax) observed by A. Peters (Am Rev Tuber 17:348 (Apr) 1928), the end-results of pneumothorax were nearly twice as good as where no pneumothorax was possible. Actually the satisfactorily collapsed group accounts for most of the difference, for when a satisfactory collapse was obtained the chance of a satisfactory result is exactly trebled. Patients with disease of a very chronic type showed the least striking result, and for these and for patients with the incomplete affective collapsed group, thoracoplasty should be preferred. Among 3095 patients admitted to the Public Sanitarium, Landes Kogem, in Norway, between 1917 and 1926, Smith (Tidskr f d

Norsk Laegefor p 535 (June) 1929) found that 270 were considered to be suitable for pneumothorax treatment. As 15 patients already had artificial pneumothorax when admitted, with these the proportion of patients selected was 92 per cent of the total. Extensive pleural adhesions existed in 141 cases, preventing induction of a pneumothorax, and in 10 other cases the pleural pocket was so small that the induction had to be discontinued. Among those in whom an adequate collapse was achieved, 49 were febrile at the beginning of the treatment, 35 of the latter becoming afebrile after induction of pneumothorax. Of the 134 cases in whom the pneumothorax had been successfully induced, 105 or 78 per cent were discharged fully or partly fit for work, whereas, this was the case with only 58.3 per cent in whom pneumothorax could not be induced. The difference between these classes was still greater when the patients were investigated in 1928. In 11 cases among those in which pneumothorax had been successfully induced, a thoracoplastic operation had subsequently been performed. Among the remaining 123 cases 67, or 54.5 per cent, are still fully or partly fit for work. On the other hand, among the 151 patients in whom a pneumothorax could not be induced, there were 23 who subsequently underwent a thoracoplasty operation. Of the remaining 128 patients, only 25 (19.5 per cent) were still fully or partly fit for work in 1928.

The displacement of the walls of the thorax during the injection of air is considered by J. Génévrier and H. Descomps (Presse med 37:941 (July 20) 1929) who maintain that an increase in the volume of the pleural cavity is not always equivalent to an increase of the collapse of the lungs. The mediastinum is displaced toward the healthy lung and is generally followed by the hilum of the lung, which results in apparent enlargement of the pleural cavity on the side of the collapsed lung, at the same time the thoracic wall on that side stretches eccentrically. In order to determine the amount of the collapse, orthodiagraphic examination should be made before and after the injection of air and at the same phase of respiration. A strumming sound in performing artificial pneumothorax was heard by Nisjaev (Klin Med



(June) 1928) This is due to an isolated single band of pleural adhesions, distended by the collapsed lung and resounding in a pneumothorax cavity. Only a single cord-like lesion produces this strumming sound and, if present, warns the operator of the possibility of rupture of the adhesion, with possible undesirable complications (See also TUBERCULOSIS, PULMONARY, TREATMENT, this volume)

**POLIOMYELITIS.**—Most of the scientific studies of anterior poliomyelitis made during the last two or three years have been concerned with the use of convalescent serum. There has also been, however, some progress in the better understanding of the mechanism of the disease.

**ETIOLOGY.**—The age incidence of anterior poliomyelitis must be extended backwards to include the fetus, and forwards to include the senium. C. S. Potts (Arch Neurol Psychiat 21 288 (Feb) 1929) described the case of a child born with the symptoms of infantile paralysis, and believes that a toxic or infectious process in the mother during the gestation period may have brought about the anterior horn cell destruction in the cord of the fetus. A case at the other extremity of life was reported by W. Bahr (Zentralbl f inn Med, 50 306 (Apr 6) 1929) whose patient developed anterior poliomyelitis when he was past sixty.

The exact etiologic organism has not yet been isolated, and P. H. Long, P. K. Olitsky, and F. W. Stewart, working on this problem, were unable to obtain evidence that the streptococcus was the causative agent. In their report (J Exper Med 48 431 (Sept) 1928) they infer that many of the organisms found are really contaminants, and emphasize the fact

that they fail to agglutinate with convalescent serum.

Noting a high incidence of poliomyelitis among children with congenital syphilis, Alterthum (Deutsche med Wchnschr 34 522 (Mar 30) 1928) suggests that this infection may make the tissues more susceptible to infantile paralysis, although he also considers the possibility of the arsenic therapy in these cases being the responsible factor in lowering the resistance of the central nervous system.

W. L. Aycock and E. H. Luther (J Prev Med 3 103 (Mar) 1929) report their work on investigation of the incubation period, and conclude that a period of from 6 to 20 days elapses between exposure and the first symptoms.

**DIAGNOSIS.**—Although the prognostic importance of early diagnosis has been repeatedly emphasized, the practical contributions to this end have been few. J. P. Leake (U S Pub Health Rep 42 2431 (Oct 7) 1927) emphasizes the importance of urinary retention, sweating, and tenderness over the spine as early and significant findings.

From the laboratory standpoint, R. L. Diveley (J Bone and Joint Surg 11 100 (Jan) 1929) finds hyperglycemia and glycosuria in many early cases, and G. M. Lyon (Am J Dis Child 36 40 (July) 1928) believes that the spinal fluid findings are suggestive. A clear fluid, a pleocytosis, and a differential cell count showing polynuclear cells in excess of 50 per cent are considered by Lyon to constitute a picture suggestive of poliomyelitis, and a subsequent shifting of the count to a mononucleosis or over 90 per cent is taken as pathognomonic.

Laboratory studies were also made by J R Kagan who (Am J Med Sc 178 67 (July) 1929) presented his work on the sedimentation tests. He finds that normal monkeys have a sedimentation time averaging more than 19 hours, while it seldom took the blood cells more than 2 hours to reach the same level when the monkeys had poliomyelitis. All of these animals had frank paralytic symptoms when the tests were made.

Another contribution to the diagnosis of infantile paralysis was made by L Babonneix and J Delarue (Paris med (Mar 17) 1928). They point out the not infrequent positive Babinski sign, and explain it on the basis of an atrophy of the anterior horn cells which supply the flexor of the big toe. They also report a case of poliomyelitis at the cervical-thoracic level, presenting a Horner's syndrome.

**EPIDEMIOLOGY**—There has been no evidence presented in the last few years to warrant modification of the belief that poliomyelitis is a personally transmitted disease. The question of its being insect borne is discussed by W H Frost (J Iowa M Soc 19 223 (May) 1929). He dismisses the possibility, calling attention to the frequency of winter epidemics and to the difficulty of transmitting the disease by injecting a virus. There is much evidence in favor of the view that it is transmitted through an upper respiratory tract infection, an opinion which is in accord with the high frequency among children.

Like other respiratory infections, it may be transmitted by non-infected carriers, a fact emphasized by M Manicatide, A Bratescu and A Rusesco (Ztschr f Kinderh 48 125

(Aug) 1929) who cite cases of infantile paralysis in epidemic-free districts brought by adults from districts where the disease was prevalent.

H Krahn (Arch f Hyg 101 65, 1929) cites statistics confirming the view that, although the incidence of poliomyelitis is higher in children, the mortality is greater in adults. Because of the similarity between the age distribution of infantile paralysis and that of diphtheria and measles, W L Aycock (Am J Hyg 8 35 (Jan) 1928) concludes that the incidence is dependent on immunity associated with subclinical infection.

As to seasonal prevalence, H Krahn and W H Frost call attention to the predominance of August and September as months of highest incidence.

If personal transmission be the mechanism of the spread of the disease, water and milk borne infection would be expected. C Kling (Svenska lak-sällsk handl 55 23, 1929) refers to several epidemics in Europe which were apparently water borne, and Aycock in 1927, reported (Amer J Hyg 7 791 (Nov) 1927) an epidemic among the wealthier classes of a British city limited to patrons of one milk dealer. Epidemiologically, anterior poliomyelitis holds the status of a personally transmissible respiratory tract infection, resulting in spinal cord invasion.

**TREATMENT**—Recently, considerable attention has been given to the serum treatment of poliomyelitis. Orthopedic correction has also made advances, but to the general medical management of the cases there has been added little that is new. M B Bradhy and I H Scheffer, working on the theory that edema is responsible for much of the damage, have

suggested (Arch Int Med 45 102 (Jan) 1930) the intraspinal use of **ephedrin**, and have reported promising results. For **serum** therapy, there are 3 kinds of preparations available (1) **Convalescent serum**, from humans who have had the disease, (2) **Rosenow's serum**, from horses immunized against the streptococcus supposed by Rosenow to be related to poliomyelitis, and (3) **Pettit's serum**, from sheep immunized by repeated injections of emulsions of spinal cords from infected monkeys. The first of these has received general approval. In regard to Rosenow's serum, F W Stewart and P Haselbauer (J Exper Med 48 449 (Sept) 1928) believe it ineffective, while G R Kamman (Minnesota Med 11 785 (Dec) 1928) holds that it may be of value, but prefers convalescent serum. Pettit's serum has been rejected by many, even in the country where it was devised, and P Nobecourt (J de med de Paris 47 447 (June 7) 1928) states that it has no value at all.

**Convalescent serum** therapy on the other hand, has been highly regarded by most writers during the last few years. A Netter (Paris med (Feb) 11) 1928) claims priority in the introduction of this method, referring to work done by Levaditi and himself in 1910. Considering the favorable reports received, no physician should deny his patient the benefit of convalescent serum therapy. The preparation is taken from the Wassermann-negative blood of persons who have had the illness and recovered, recent victims of poliomyelitis being considered better donors than older ones.

Administration may be either intraspinal or intramuscular. In the latter

case, larger doses are used, 25 c c being the standard amount for intramuscular injection. By this method J M McEachern, B Clown, L G Bell and M McKenzie report a 93 per cent recovery in patients treated in the pre-paralytic stage (Canad M A J 20 369 (Apr) 1929), a 40 per cent partial and a 20 per cent complete recovery in patients treated after onset of the paralysis. When used intraspinally, the serum should be inactivated. The dosage is 10 c c to infants, 25 c c to adults and proportional amounts to children. A second intraspinal administration should be performed if indicated. Intravenous administration is seldom as good as the intrathecal route.

In a report submitted by W D Ayer (Am J M Sc 177 540 (Apr) 1929), 90 per cent of the cases treated intraspinally within the first 24 hours recovered without residuals, 6 per cent were left with mild paralysis, 2 per cent died, and 2 per cent had extensive paralytic residuals. Cases seen after the forty-eighth hour are less responsive to serum therapy, and in Ayer's series, the 90 per cent complete recovery that followed early treatment is contrasted with a 30 per cent complete recovery in those receiving later therapy.

Because of the good results obtained by the early use of convalescent serum, some provision should be made for a ready supply of this during epidemics. Any healthy person who has recovered from an attack of poliomyelitis (even if very many years ago) may be used as donor, the blood collected should be allowed to separate into sediment and serum, and the latter should be inactivated

and preserved with 0.2 per cent tricresol until it is required

Recent progress in the orthopedic management of poliomyelitis has been concerned largely with improvements in operative technic, although E. Delcroix re-emphasized a frequently neglected factor when he called attention to the importance of maintaining the nutrition of the affected part. He does this (Bruxelles-méd 8 360 (Jan 15) 1928) by the use of baths of warm sea water activated by ultraviolet rays. During the early stages of infantile paralysis, while the patient is acutely ill, no surgical treatment should be considered, excepting some mild measures directed against the formation of contractures and deformities. The use of sandbags, pillows, etc., should be adequate. After subsidence of the febrile symptoms, stimulation of the muscles by massage, electricity, and exercise is in order. During the convalescent period braces are indicated to protect the paralyzed muscles. According to C. F. Clayton (Texas State J Med 23 417 (Oct) 1927), no operative procedures should be entertained until after the expiration of 2 years, to allow for full spontaneous improvement. R. Scherb (Ztschr f orthop Chir 50 470 (Nov 13) 1928) warns against failing to consider the problem of synergy, antagonism, and reciprocal innervation when contemplating orthopedic operations. Surgical procedures usually are designed to stabilize flail joints, or to improve mobility by tendon transplants.

**PROPHYLAXIS**—The prevention of infantile paralysis rests largely on the pursuit of proper hygienic measures, such as isolation, avoidance of contact, elevation of body resist-

ance, etc. In addition to these general measures, serum immunizations may be used. The use of attenuated virus for this purpose seems to have experimental justification, according to W. L. Aycock and J. R. Kagan (J Immunol 14 85 (Aug) 1927), but has not received proper clinical trial. On the other hand, the use of human convalescent serum is a worthwhile procedure, and the passive immunization of the other children in a household when one is ill with poliomyelitis is indicated. S. Flexner and F. W. Stewart (New England J Med 199 213 (Aug 2) 1928) suggest the use of the convalescent serum prepared as described above. The dose is 10 to 20 c.c. It should be injected subcutaneously, and will, the authors believe, give an immunity lasting 4 weeks. If the exposure continues beyond this time a re-inoculation is indicated.

The recent development of serum therapy and serum prophylaxis has brought hope into a previously discouraging field of medicine.

**POLYARTHRITIS.**—A green streptococcus was cultured from the blood in 68 per cent of cases of polyarthrititis by L. Surányi and E. Farró (Klin Wchnschr 7 453 (Mar 4) 1928).

Acute polyarthrititis during childhood has been studied by E. Stettner (Deutsche med Wchnschr 55 261 (Feb 15) 1929), who reports his observations on 50 cases. He found that the infection enters the body usually through the oral cavity. In a number of instances, he observed decayed teeth. In 29 cases, he found hyperplastic or otherwise diseased tonsils. Angina was observed in 21 patients.

The author's observations also proved that acute polyarthritis is partly due to an hereditary susceptibility to the disease. The fever curve was, in most cases, very irregular. Stettner also observed disturbances in the capillary system (increased permeability). The clinical symptoms under which the disturbances in the vessels became manifest were epistaxis, vomiting of blood and hematuria. Examination of the blood revealed a slight leukocytosis. The author asserts, however, that the changes were usually not in proportion to the severity of the disease.

F. Plate (Med. Klin. 25: 464 (Mar. 22) 1929) reviews 176 cases of acute polyarthritis. The majority of the cases gave a history of previous tonsillitis. In only 13 cases could the disease be traced to acute angina. In 107 instances tonsillar plugs could be found. The first aim of the treatment should be to remove these tonsillar plugs. The author is not in favor of tonsillectomy, because in many cases it is not possible to remove the diseased tonsils completely. Instead, he advises that the tonsillar plugs be removed by means of a sickle-shaped knife. In doing so, the crypt is generally split, and following this, iodine should be applied.

Cecal stasis and its relation to polyarthritis is discussed by R. Smith (J. Bone and Joint Surg. 10: 57 (Jan.) 1928). He states that clinical evidence indicates that chronic polyarthritis is due to the absorption of bacterial toxins or toxic metabolic end-products, the result of an unbalanced ileocecal flora dependent upon ileocecal stasis and an occasional shower of bacteria from the same source. In the presence of

a mechanical block of the cecum, it is almost impossible to change the flora to normal, but after removal of the block, the same dietary treatment which failed to influence either the flora or the symptoms before the operation will result in cessation of the pain, stiffness, and contraction due to arthritis. In Smith's cases, the following examination and treatment are given: (1) The ordinary sources of focal infection, such as the teeth, tonsils, sinuses and pelvis, are investigated and, if necessary, cleaned up; (2) an x-ray examination is made of the gastro-intestinal tract to determine its mobility and motility, special attention being paid to the ileocecal coil; (3) a balanced diet is given for 48 hours in order to obtain a standard for comparison, and on the morning of the third day, a stool smear is obtained from a freshly collected specimen; (4) if the stool examination shows unbalance and the x-ray reveals no gross pathological condition, the patient is placed on a medical regimen designed to restore the normal intestinal flora; (5) in cases with distinct cecal block and prolonged cecal stasis, the medical treatment is preceded by operation.

R. G. Taylor (J. Bone and Joint Surg. 10: 62 (Jan.) 1928) states that from fluoroscopic examination the most important factor responsible for stasis is found to be a twist in the ascending colon. When the cecum is dropped into the pelvis in the standing position, a rather characteristic crook or kink appears, usually just above the ileocecal level and at the lower border of the membranous attachment. At this level and distal to it, there is definite thinning of the barium shadow

due to narrowing of the bowel by torsion. Subsequent 24-hour observations are important in demonstrating the delay in emptying.

Large doses of **sodium salicylate** are reported by Y. T. Peters (Siglo méd 84 335 (Sept 28) 1929) to have given good results in the treatment of *chronic* and *acute rheumatic polyarthrititis*. During the entire treatment, the patients were confined to bed. All the affected joints were covered with cotton. The author used the following formula: **Sodium salicylate**, 30 Gm (1 ounce), **sodium bicarbonate**, 60 Gm (2 ounces), **simple syrup**, 300 c c (10 ounces) and **distilled water**, 1000 c c (1 quart). This preparation was given in doses of 50 c c (1½ ounces), every 2 hours (from 8 A M to 12 P M) till the fever disappeared. **Sugared water** was given after each dose. Unpleasant effects were not observed. If the patient complained of discomfort, either a dose was omitted or the treatment was stopped for 1 day. After the disappearance of the fever, the patients remained in bed for 3 days, during which time they received the same dose of the preparation. Thereafter the remedy was given at intervals of 4 hours. If the pain reappeared, the intervals were decreased to 2 hours for a few days more. As soon as there was improvement, the 4-hour interval was resumed and maintained for 1 month more. The author believes that the treatment should also be useful in rheumatic endocarditis.

**Sympathetic ganglionectomy** and **ramisectomy** in polyarthrititis have been reported by L. G. Rowntree and A. W. Adson (J. A. M. A (July 20) 1929). They state that in certain

types of arthritis, the sympathetic nervous system of the extremities is hyperactive, producing a marked vasomotor disturbance and profuse sweating, and possibly contributing to the spasm and atrophy of the muscles with the resultant deformities. The clinical picture is characterized by coldness of the extremities, marked sweating, tender, painful and swollen joints, and trophic changes in the muscles, skin and nails. In the case reported, all of these abnormal manifestations disappeared on release of the extremities from sympathetic control. The relief in the lower extremities was complete, lasting over a period of almost 3 years. Similar results were obtained in both hands following **cervicothoracic sympathetic ganglionectomy**, but there are still some slight residual manifestations of arthritis, slight pain, and limitation of motion in both wrists. In the types of arthritis associated with marked bony changes, sympathetic ganglionectomy may be of little if any value.

In the treatment of the subacute stage of polyarthrititis, E. Weisz (Munch med Wchnschr 75 515 (Mar 23) 1928) emphasizes the importance of stopping cold applications as soon as the fulminant stage has passed, to prevent the establishment of a local anemia, which interferes disastrously with reconstruction. **Moist dressings** prepared with **warm sulphurated water** are useful in reducing subacute swellings. **Massage** and **gymnastic exercises** must be used with extreme care in the first stage of treatment.

**POROKERATOSIS.—ETIOLOGY AND TREATMENT—**Acton (Indian J. M. Research 15

349 (Oct ) 1927) defines porokeratosis as a hyperkeratosis which spreads in an irregular centrifugal manner. He has a record of 8 cases which he observed in the past few years.

*Etiologically* the disease appears to be associated with some hereditary factor closely related to endocrine function. The association of a familial tendency and the lowered basal metabolic rate suggests a partial correlation with hypofunction of the thyroid gland.

He states the lesions can be cured in a few weeks by **thyroid** medication. The dose of thyroid extract is regulated by the degree of deficiency of the metabolic rate, being increased or diminished so as to keep the pulse rate between 90 and 100.

#### **PREGNANCY.—EARLY DIAGNOSIS —(A) CHEMICAL TESTS**

The first group of tests, including the Abderhalden reaction and its modification by Luetge and von Mertz, Eredes anaphylactic reaction, Costa's novocaine-formation reaction, Dienst's reaction and the red cell sedimentation test, purpose to prove the presence of a specific protein in the nature of a ferment circulating in the maternal blood. These tests are, for the most part, too complicated for practical purposes and not wholly dependable as diagnostic criteria.

The second group of tests embrace the alimentary glycosuria test of Frank and Northman, the Roubitschek adrenalin test and the phloridzin test. These depend on the tendency towards glycosuria in the early months of pregnancy. They are equally unreliable.

**(B) BIOLOGIC TESTS**—Following the recent progress in the study of

endocrinology, 3 biological tests for the early recognition of pregnancy have been described.

1. *Anterior Pituitary Hormone Test*—According to Aschheim and Zondek (Klin Wchnschr 7 8 (Jan 1) 1928), this depends on the influence of the hormone of the anterior lobe of the pituitary gland in stimulating ovarian growth. In pregnancy, there is an excess of the secretion of the pituitary, which finds its way in concentrated form into the blood and urine. The subcutaneous injection into *immature female mice* (3 weeks old—maximum weight 7 Gm—1½ drams) of 2 cc (½ dram) of the morning urine of pregnant women, in divided doses, is followed by striking alterations in the ovaries, manifested by marked enlargement, hemorrhages into the follicular cavities and the formation of corpora lutea.

By these means, Aschheim and Zondek examined 410 specimens of urine from women with normal pregnancies, and obtained positive results in 402. In 238 specimens from women in the first 8 weeks of gestation, 233 gave a positive test (98 per cent accuracy). Several times the test was found positive as early as 3 to 5 days after the date of the expected menstruation.

Similar success with this test has been reported by R. Bruhl (Deutsche med Wchnschr 55 696 (Apr 26) 1929), K. Ehrhardt (Munchen med Wchnschr 76 82, 1929), H. W. Louria and M. Rosenzweig (J. A. M. A 91 1988 (Dec 22) 1928), and numerous other investigators.

R. Bruhl (Deutsche med Wchnschr 55 696 (Apr 26) 1929) obtained a positive reaction in 67 out of 68 preg-

nant women and in all of six ectopic pregnancies

The University Clinic of Frankfurt, in a test of 350 patients, and Schaefer's clinic in Charlottenburg, in a test of 100 patients, obtained accurate results in 98 per cent

H Allen and F Dickens (Lancet 1·39 (Jan 4) 1930), in a study of 208 pregnant and 29 non-pregnant women obtained only 5 incorrect results

Fifty patients were examined in the Woman's Hospital, New York, with only 1 error

Dodds, at the Courtauld Institute of Biochemistry of the Middlesex Hospital, reports that out of 126 pregnant patients, 122 gave positive reactions, while among 82 non-pregnant women, only 1 gave a positive Aschheim-Zondek reaction

Phillipp (Zentralbl f Gynak 53 2386 (Sept 21) 1929) believes that the Aschheim-Zondek reaction in pregnancy is due less to an over-production of hormone by the anterior lobe of the hypophysis than to a new production of hormone by the fetal tissues

E T Engle (J A M A 93 276 (Julv 27) 1929) found that the injection of the urine of pregnant patients causes follicular growth similar to the transplantation of fresh anterior pituitary gland. At this point, however, the comparison ceases. The fresh gland transplant results in ovulation with possible subsequent luteinization. The injection of urine of pregnant patients, on the other hand, causes ovulation to be effectively inhibited by the sclerosis of the granulosa, thereby transforming the follicle into a corpus luteum, *ie*, luteinization of the follicle. Engle questions, therefore, whether the

ovarian changes which are found with positive tests are purely pituitary effects. This, however, does not affect the reliability of the test

It is regrettable that from its nature the Aschheim-Zondek test cannot be made generally available, as it requires a laboratory with a large stock of mice and a staff of trained technicians

A *skin test* has been proposed which may overcome this difficulty. The injection of 0·2 c.c. (3½ minims) of the hormone of the anterior lobe of the pituitary gland into the skin of a gravid woman produces no reaction, whereas an injection in the same way, in a non-pregnant woman, produces a distinct red circle in a few hours, which persists from 24 to 36 hours. Recently Pollatschek and Porges, of Vienna, have made some valuable observations on this phase and report that in their hands the skin test has proved to be quite reliable, except in 1 patient, who had a hypophyseal tumor

*2 Female Sex Hormone Test*—According to Mazer and Hoffman (Am J Obst and Gynec 17 48, 1929, *ibid* 186, 1929), this test is dependent upon the fact that varying quantities of ovarian or female sex hormone are found in the urine of pregnant women as early as one week after the first missed period. *Two adult castrated mice* are injected with 2 c.c. (½ dram) of boiled urine 5 times consecutively in the course of 2 days. The succession of changes in cell types found in the vaginal lumen of white mice during the estrual cycle, due to the female sex hormone content of the urine, as noted by E Allen and E A Doisy (J A M A 81 10 (Sept 8) 1923), forms the basis of this test. The



presence of an increasing number of nucleated epithelial cells with only few leukocytes denotes activity in the vagina. It is then necessary to examine the vaginal secretions 2 or 3 times daily in order not to overlook anestrus phase.

A spread showing a preponderance of squamous, non-nucleated epithelial cells and an absence of leukocytes and mucus is indicative of pregnancy. By this means, 143 women less than 3 months pregnant, were studied and 119 positive reactions were obtained. In 128 control patients with gynecological conditions, 126 were negative. A positive result, according to these investigators, may be relied upon as indicating pregnancy. A negative result calls for further investigation. Smears from a dead animal should be disregarded. The failure of 1 of the 2 animals to react, may be due to atrophy of the vaginal mucosa incident to a prolonged interval between castration and the test.

Why the female sex hormone should appear in the urine long before it can be demonstrated in the blood is thus far inexplicable.

Aschheim and Zondek (*loc cit*) discredit this test, claiming that the amount of ovarian hormone in the urine in the early part of gestation is insufficient. They state also, that they have observed women with amenorrhea who, though not pregnant, excrete large amounts of ovarian hormone in the urine (hyperhormonal amenorrhea).

3 *Blood Hormone Test* (Siddall) — This test is based on the theory that the hormone responsible for the growth of the uterus in the pregnant woman should cause similar changes

in the uterus of a non-pregnant test animal receiving injections of her blood. One c.c. (16 minims) of the blood serum is injected daily for 5 days into *immature virgin mice*. When estrus is evident, the uterus and ovaries are removed. The weight of the animal is divided by the weight of the excised organs. A quotient of 400 or less is indicative of pregnancy.

A. C. Siddall (J. A. M. A. 90:380 (Feb. 4) 1928) reports only 5 negatives in 103 pregnant women, 19 of whom were less than 3 months gravid. In early pregnancy, the uterine enlargement is probably influenced by the anterior pituitary hormone, since there is very little ovarian hormone in the blood before placentation occurs.

**PREGNANCY, BLOOD IN.—MODERN CONCEPTION—ANEMIA.**—Since 1927 routine hematologic examinations were made on all gravid women in the antenatal clinic of Jefferson Medical College Hospital. These examinations consisted of erythrocyte, leukocyte and platelet counts, hemoglobin estimations and Wassermann and blood sedimentation tests. P. B. Bland, A. First and L. Goldstein (J. A. M. A. 93:582 (Aug. 24) 1929, Am. J. M. Sc. 179:48 (Jan. 1) 1930, Surg., Gynec., Obstet., 1930 in Press) report the results of the study of the blood counts of 1000 patients examined in various periods of gestation with the following conclusions:

1. Of the entire group of 1000 pregnant women, 47.4 per cent gave evidence of an anemia with red cell counts of 3.5 million or less.

2. A distinct hemoglobinemia of 70

per cent or less occurred in 58.6 per cent. of the gravida

3 Only 24.7 per cent of the patients examined in the first 2 trimesters showed an anemia below 3.5 million in contrast to 56.7 per cent of the patients examined in the third trimester. This points to a progressive anemia with the advance of pregnancy. In a group of 45 patients with a definite anemia in the early months of gestation, however, 26 or 58 per cent showed improvement at term. There appears to be a slight improvement, therefore, in the last week of pregnancy in a certain percentage of the patients manifesting a moderate degree of anemia.

4 Of 106 patients with an anemia below 3.5 million, however, 58.4 per cent began to show improvement (increase of 200,000 cells or more per c mm), within 1 to 2 days after childbirth. Within 7 to 10 days after labor the percentage of improvement had increased to 72.6 per cent.

5 The most interesting feature disclosed by their study was the remarkable recovery developing within 2 to 6 months after delivery. A distinct improvement in the red cell count took place in 92 per cent of the 100 selected patients examined. In 95 per cent of these patients there was also a decided improvement in the hemoglobinemia.

E. C. Lyon, Jr (J. A. M. A. 91:11 (Jan 5) 1929) observed a similar anemia in a group of non-pregnant women with retroversion and he, therefore, maintained that the anemia of pregnancy represented a pre-existing anemia. The distinct improvement noted by Bland and his co-workers within 2 to 6 months after delivery certainly denotes that the

anemia probably did not exist prior to gestation.

The results of examinations of 100 private maternity patients at term were compared with those of the ward patients in order to determine if environment and living conditions influenced the incidence of anemia in pregnancy. It was observed that about 62 per cent of the private patients had a hemoglobin percentage of less than 75 as compared with over 80 per cent of the ward patients at term.

The percentage of private patients with red cell counts below 3.5 million was 26 per cent or almost half that of the ward patients. The fact that the private patient coming from an environment conducive to good health manifested an anemia, although not as severe as the ward patient, indicates that pregnancy *per se* in some manner is probably accountable for the blood deficiency.

The etiology of the anemia of pregnancy remains undisclosed. The withdrawal of iron from the maternal corpuscles by the growing fetus, the maternal blood destruction by a syncytial hemolysin in the ectodermal cells of the chorion as advanced by Hofbauer, a pre-existing chlorosis and the relative deficiency due to increase in blood volume, are probable factors in the production of this so-called physiologic anemia of pregnancy.

Experimental work to date indicates that in the latter half of pregnancy there is a definite increase in blood volume. Kaboth estimated that the total increase in blood volume during pregnancy is about 400 c.c. while Gueissaz and Warner estimate the increase to be about 15 per cent.

The data of Keith, Rowntree and Geraghty reveal an increased amount of blood and plasma during the latter half of gestation. The mean blood volume for women averaged 857 c c per kilogram (2 $\frac{1}{2}$  pounds) of body weight. This rose in the latter period of pregnancy to 956 c c for each kilogram of uncorrected body weight.

Following delivery there was a large decrease in the absolute blood volume which was greater than could be accounted for by the loss of blood at parturition. The average decrease in blood 7 to 10 days after delivery was 1100 c c, whereas the average loss of blood at delivery was only 300 c c, the volume of fetal blood accounting for the remaining 800 c c taken from the maternal circulation.

This increased volume of the blood might manifest itself in a lowered red cell count. It is difficult to understand, however, how the condition of the blood in pregnancy is greatly influenced by this dilution, since as pointed out by C. E. Galloway (J. A. M. A. 93:1695 (Nov. 30) 1929) the majority of the cases responded to treatment with iron and arsenic, liver therapy and the ultra-violet ray.

Although the true significance of pregnancy anemia is undetermined, a systematic blood examination is urged in the prenatal period of all patients. Therapy should likewise be instituted in all patients with a blood quality well below the normal level.

**SEDIMENTATION TEST**—Fahraeus, in 1918, directed attention to the increased sedimentation of the red cells in pregnancy. The significance of the test, however, with special reference to its relation to

anemia has recently been studied by P. B. Bland, A. First and L. Goldstein (Surg., Gynec. and Obst. 50:429 (Feb.) 1930). The Cutler graph method was employed because of its simple technic and because of the ease with which the results could be graphically recorded.

Tests performed upon 540 women in different periods of gestation and in the puerperium were analyzed. In 536 patients or 99 per cent sedimentation occurred more rapidly than in the normal non-pregnant woman. It was found that 250 patients (46 per cent) had a sedimentation time of 35 to 60 minutes, which is equivalent, graphically to a diagonal curve, whereas 112 patients (20 per cent) had a sedimentation time of less than 30 minutes, equivalent to a vertical curve.

Of the 453 women examined in the last trimester of pregnancy, 50 per cent manifested a very marked acceleration of sedimentation equal to either a diagonal or vertical curve.

Only 24 or 30 per cent of 79 patients with a normal blood count gave either a diagonal or vertical curve, whereas 91 per cent of 86 patients with a severe anemia (counts below 3 million) showed a similar increase of sedimentation velocity.

Only 64 per cent of the 394 patients having a leukocyte count below 10,000 gave a very rapid sedimentation rate as compared with 92 per cent of the 26 patients having a high leukocyte count (15,000 or over).

The same sedimentation rates as occurred during pregnancy were maintained during the first 10 days after delivery.

In practically all of the women examined, the sedimentation reaction

and the erythrocyte count returned to normal within 6 months after delivery

From these studies, the conclusions reached may be summarized as follows

1 Sedimentation of the erythrocytes in pregnancy is considerably more rapid than in the non-pregnant state

2 This acceleration is primarily dependent upon the increased fibrinogen content of the plasma (as demonstrated by Gram) and, secondarily, on the anemia and leukocytosis "physiologically" present in pregnancy

3 The sedimentation reaction may be employed as an index of the coagulating property of the blood in pregnancy, a slow sedimentation after the fourth month of gestation indicating a deficiency in the fibrinogen content of the plasma. Such alteration in the coagulability of the blood may manifest itself in excessive post-partum hemorrhage

**BLOOD PLATELETS** in Pregnancy and in the Puerperium—In a further study of the blood, P B Bland, A First and L Goldstein (Am J Obst and Gynec, 1930, In Press) made determinations of the number of platelets (thrombocytes) in pregnancy and in the puerperium. This was undertaken because comparatively little is known of the behavior of the platelets in pregnancy, and because of the important relation of these elements to blood clotting

It has been pointed out by several investigators recently, that a pronounced increase in fibrinogen occurs in pregnancy. Greisheimer found a correlation existing between the fibrin content of the blood and sedimentation, namely that as the fibrin content increases the sedimentation rate

becomes more rapid. The excessive production of fibrinogen is probably an expression on the part of the body to control hemorrhage during labor by increasing the elements necessary for hastening blood coagulation

According to Bland and his co-workers, the blood platelet count for the non-pregnant woman was found to vary from 250,000 to 350,000 per c mm.

Platelet determinations made on 230 women in various stages of gestation and on 100 women after delivery, revealed that *blood platelets are not appreciably increased in pregnancy*. It appears, therefore, that a rise in platelets is not essential in increasing blood coagulability in pregnancy. This added power of the blood to clot in pregnancy may be explained entirely on the basis of an increased fibrinogen content of the blood. A low platelet count encountered in pregnancy, however, may be an indication of the presence of a hemorrhagic diathesis, especially if the deficiency in platelets is associated with a severe grade of anemia. In such a contingency it may be of value to stimulate platelet formation by the use of the ultra-violet light or by irradiation with small doses of either radium or the x-ray, as suggested by W Cramer and R G Bannerman (Lancet 1 992 (May 11) and 1 1048 (May 18) 1929)

In a study of the blood platelets of 100 women in the puerperium, Bland, First and Goldstein found the following

1 Twenty-seven per cent of the 100 gained over 50,000 platelets per c mm, within 24 hours after labor.

2 Fifty-five per cent gained over 50,000 platelets within 3 to 5 days after delivery

3 Fifty-one per cent showed a similar gain within 8 to 10 days after delivery

It is rather difficult to offer an exact explanation of the rise of the platelet count in the third to the tenth day of the puerperium. This may be in the nature of a defensive act of the body against invasion by pathogenic organisms, analogous to the physiologic leukocytosis in gestation. In cases of puerperal sepsis ending in recovery, S Téoumine (Gynec et obst 15 436 (June) 1927) found that the number of platelets was much higher than in those ending fatally. It has been recently suggested that a relationship exists between the number of platelets and thrombosis. It was observed by R. Y. Dawbarn, F. Earlam and W. H. Evans (J Path and Bact 31 833 (Oct) 1928), that the tendency to thrombosis is increased when the platelets are increased in number. In 2 patients, high platelet counts were found in association with thrombosis. Further investigation is necessary for a complete solution of this problem.

**SUMMARY.**—Briefly, the condition of the blood in pregnancy, in accordance with modern investigation, may be summarized as follows:

*Elements Increased* — (a) Volume, averaging 95 c c in the later months for each kilogram ( $2\frac{1}{5}$  pounds) of body weight

(b) Plasma volume, averaging 58 c c for each kilogram of body weight

(c) Water, serous plethora

(d) Leukocytes, 15,000 to 20,000

(e) Fibrin, 33 per cent

(f) Fibrinogen, 33 per cent

(g) Platelets or thrombocytes, unaltered or slightly increased.

(h) Adrenalin

(i) Cholesterol

(j) Lipoid content

(k) Precipitation time, 4 times more rapid

(l) Coagulation time

(m) Bleeding time

*Elements Decreased* — (a) Hemoglobin

(b) Red blood cells.

(c) Specific gravity

(d) Albuminous content

(e) Alkali reserve as evidenced by a lower alveolar carbon dioxide tension (30 to 35 mm Hg) and a lower carbon dioxide combining power of plasma or serum. This is not an accumulation of abnormal acids but is a compensated alkali deficit.

(f) Freezing point (H. C. Oard and J. P. Peters, J Biol Chem 81: 9 (Jan) 1929)

**PREGNANCY, HEART DISEASE IN.**—There is scarcely any complication of pregnancy that arouses so much difference of opinion as heart disease. The obstetrician is not the individual to separate the grave from the minor types of valvular heart disease or to determine the influence of pregnancy on either the one or the other. This task must unreservedly be assigned to the skilled cardiologist. During pregnancy, the heart is displaced upward and to the left, the apex beat often felt in the fourth interspace, though it is now generally conceded, owing to the revelations of cardiography, that very little if any change takes place in the heart wall.

**INCIDENCE**—It is difficult to obtain records of a large number of cases, because grave heart disease complicating pregnancy all in all is comparatively rare. There appears

to be a considerable difference in the statistics published by various clinics of the incidence of this disorder

Thus, among 8410 patients delivered at the Boston Lying-In Hospital between 1922 and 1927 inclusive, 528 women were listed as suffering with heart disease, an incidence of 6.2 per cent

At the New York Lying-In Hospital a total of 7860 patients were delivered between July, 1923 and July, 1925. Heart disease as a complication was reported in 112 of these women, an incidence of only 1.4 per cent

At the Robinson Memorial, 40 patients or 0.7 per cent of the 5271 patients delivered between 1925 and 1927 had evidence of cardiac disease

Williams, quoting from the reports of several prominent writers, states that the incidence of the complication varies between 1 and 2 per cent, with a mortality of about 2 per cent. The discrepancy between this low figure and the higher figures of other investigators is due to the fact that not all patients with heart symptoms, suffer from true cardiac disease, the basis of Williams's study

According to B. E. Hamilton and F. S. Kellogg (J. A. M. A. 46:382 (Mar.) 1928), about 7.5 per cent of patients have something in their history or physical examination suggestive of possible heart disease. One group, complaining of breathlessness, tachycardia, pain, dizziness and fainting, may show no evidence of cardiac trouble. This group will respond favorably to symptomatic treatment. Another questionable group exhibits systolic murmurs, possible enlargement and extrasystoles. This class

also does well, as a rule, without special therapy

Of 882 patients who were referred to the special clinic for supposed heart disease, only 25 per cent had true cardiac disorders, in most instances of rheumatic origin

Wagner, in a systematic study of 8000 pregnant women in the Prague Clinic from 1917 to 1925, found 86 cases of organic heart disease, an incidence of 1.6 per cent

Fitz-Gibbon, in a report from the Rotunda Hospital, Dublin, with modern methods of examination, found an incidence of 0.33 per cent with a mortality of 22.7 per cent

In a series of 9936 pregnancies studied in the Zurich Clinic by E. Frey and F. Lardi (Ztschr. f. Geburtsh. u. Gynak. 93:1, 1928), 0.7 per cent of the patients had complicating heart disease. Mitral stenosis and insufficiency were the most common lesions encountered

**PROGNOSIS**—It is exceedingly difficult to advance an opinion regarding the safety of pregnancy in a patient with a diseased heart. At one extreme one finds the disquieting mortality figures of Hart, of 87 per cent, and at the other, the optimism of Prassulides, with no mortality whatsoever

In a survey of the clinical records of the Department of Obstetrics of Jefferson Medical College Hospital between 1925 and 1929, only 1 fatality consequent upon heart disease complicating pregnancy was noted. This occurred in a patient suffering with *recrudescant vegetative endocarditis*, a lethal consummation which probably would have occurred irrespective of the stress entailed by gestation. We are inclined to look upon gross heart

disease in pregnancy, therefore, with more or less equanimity

A uniform classification of patients with heart disease must be adhered to in order to afford a proper evaluation of these diverse reports and a satisfactory prognostic criterion. The functional type of cardiac trouble which is fairly common, must be differentiated. Statistics will vary greatly unless this disorder is excluded from the tabulation.

S. A. Gammeltoft (Surg., Gynec. and Obst. 46:382 (Mar.) 1928), of Copenhagen, in a recent contribution, made a study of 239 normal pregnant women. Nearly all the patients passed through pregnancy and labor without evidence of serious circulatory disturbance although during the last 2 months of pregnancy, 39 or 16.3 per cent showed signs suggesting organic heart disease. Acceleration of the pulmonary second sound, occasional extrasystoles and faint systolic and diastolic murmurs at the base of the heart were heard. Most of the symptoms and signs subsided shortly after labor and in no instance could these findings be detected 4 weeks after delivery, indicating a functional or "gestatory" disturbance.

The majority of recent investigators classify their patients according to the degree of insufficiency of the heart, rather than according to the structural lesions diagnosed.

The classification of functional capacity now made official by the American Heart Association is perhaps most satisfactory. Patients with heart disease are divided into 3 groups.

**Group I** Patients with organic heart disease, able to carry on ordinary physical activity without discomfort.

**Group II** Patients with organic heart disease, unable to carry on ordinary physical activity without discomfort. The limitation of activity may be slight or moderate.

**Group III** Patients with organic heart disease and with symptoms or signs of heart failure when at rest. These women are unable to carry on any physical activity without discomfort.

As long as the patient has a satisfactory functional capacity and there is no undue enlargement of the heart, the presence of valvular disease should be no bar to marriage or pregnancy. The time in pregnancy when cardiac insufficiency appears and the response to therapy are all important factors governing the prognosis.

Hamilton and Kellogg (*loc. cit.*) report that nearly 20 per cent of the maternal deaths at the Boston Lying-In Hospital in a 4-year period and 28 per cent of the maternal deaths at the Faulkner Hospital, Boston (private obstetric wing) in a 7-year period, were furnished by patients with seriously damaged hearts.

M. F. De Kruif (New England J. Med. 199:1302 (Dec. 27) 1928) reports that in the entire state of Massachusetts, cardiac disease was the cause of death in 6.2 per cent of the deaths of primiparae and in 7 per cent of the deaths of multiparae.

W. D. Reid (Am. J. Obst. and Gynec. 19:63 (Jan.) 1930) analyzed the relation of the mortality from heart trouble to that from all causes between 1921 and 1927 inclusive. The deaths attributed to heart disease were found to comprise 17.2 per cent of the total maternal mortality in the Boston Lying-In Hospital, 8.1 per cent in the New York Lying-In Hos-

pital, and 51 per cent in the Robinson Memorial Hospital. The total number of deliveries for these 3 clinics during this period was 45,320, with 480 maternal deaths, of which 48 (10 per cent) were from heart disease. Thus, it is evident that but 1 mother died from organic heart disease for each 1000 patients delivered.

The mortality of cardiac disease complicating pregnancy varies greatly. Reid collected 830 cases from the literature, with a death rate of 51 per cent.

According to Reid (*ibid*) over 90 per cent of the cases of organic heart disease in pregnancy are of the rheumatic type. The average age at death of patients with rheumatic heart disease, according to statistics is 35.5 years. Pregnant women with heart disease may perhaps die because of the natural evolution of the rheumatic heart disease rather than because of pregnancy and parturition.

H. E. B. Pardee (Am J Obst and Gynec 17:255 (Feb) 1929), consulting cardiologist to the New York Lying-In Hospital, records 112 cases of heart disease with 6 deaths (5.3 per cent). Of 17 patients with serious organic disease 4, or 23.5 per cent, died.

Wagner found a mortality of 14 per cent in 86 patients studied.

In the Royal Maternity Hospital, Glasgow, the mortality is recorded as from 15 to 25 per cent.

The lethal influence of heart disease on intrauterine life owing to deoxygenation of the fetus, and the uterine engorgement from failing compensation should be borne in mind. Bierring reports that abortion occurred in 13 per cent of 87 patients with heart trouble.

The studies of J. Corwin and W. W. Herrick (Am J Obst and Gynec 13:617 (May) 1927) seem to show that pregnancy and labor, when properly supervised, are not a great menace to the safety or life of the average cardiac patient.

A striking relationship between toxic hypertension and cardiovascular disease was found by these investigators. In 165 patients with organic heart disease, 74 per cent showed in addition to frank *cardiac hypertrophy*, sclerosis of the peripheral vessels, changes in the retina, and post-partum hypertension, which lasted from 6 months to several years. In 37 per cent the hypertension was looked upon as permanent. Fifty-two of the patients, who later became pregnant, showed signs of arterial disease.

**TREATMENT**—The first essential in the management of heart disease complicating pregnancy, is the cooperation of a heart specialist. The treatment may be separated into 2 divisions, depending on the period of pregnancy. If the patient suffers with decompensation before the fifth month, gestation should be interrupted by **vaginal hysterotomy**, employing **local or spinal anesthesia**. In the later period of gestation, **Cesarean section with tubal excision** for sterilization is preferable.

If one decides to attempt to carry the fetus to term, and this constitutes the procedure for the majority of cases studied, **absolute rest in bed** is essential. In elderly primigravida or patients with contracted pelvis, where labor may be tardy, abdominal **Cesarean section** under **local or spinal anesthesia** is indicated.

Zinsstag (Monatschr f Geburtsh u Gynak 75:498, 1927) reports that



in the Aarau and Basle Clinics during 1927, all the fatal cases of heart disease during pregnancy were in women who had *mitral stenosis*. **Pregnancy**, in his opinion, should be **terminated** irrespective as to whether or not signs of decompensation are present. R. T. von Jaschke (Zentralbl f Gynak 51 1354 (May 28) 1927), however, believes that termination of pregnancy and sterilization should be resorted to only in case of decompensation. The power of accommodation of the myocardium and not the narrowness of the stenosis determines whether the patient can endure pregnancy and labor. When signs of cardiac failure develop during pregnancy, the failure should be overcome before interference is considered.

During labor the patient is liberally supported by **narcotics**. The second stage is shortened by **forceps**. Convalescence is prolonged so as to allow proper restoration of cardiac reserve.

The conclusions drawn from these investigations seem to indicate that although a damaged heart is an additional risk during pregnancy, the majority of patients may be carried to term and delivered safely provided, of course, they are zealously cared for during the period of gestation as well as during the 3 stages of labor.

**PREGNANCY, PELVIC IRRADIATION AND.**—It has recently been pointed out that the ovaries, especially their follicular elements, are peculiarly sensitive to the rays of radium and x-rays. Definite structural and functional changes have been demonstrated after irradiation. There is still some uncertainty, how-

ever, as to the ultimate effect of the rays upon the offspring *in utero*, and their influence upon the ovum prior to conception. The alteration in development observed in some of the children born after pelvic irradiation, raises the question as to whether the defects reported are dependent upon radiologic therapy.

A discussion of this problem resolves itself, accordingly, into first, the possible influence of irradiation upon the fetus in utero, and second, its effect upon an ovum which may subsequently become fertilized.

Injury of the human fetus resulting from therapeutic use of the x-rays or radium has been reported at a meeting of the Royal Society of Edinburgh in 1927, by A. S. Parkes (Proc Roy Soc Edinburgh 102 51 (Aug 2) 1927) and by Mundell, E. Ries (Am J Obstet and Gynec 11 361, 1926) and J. Zappert (Monatschr f Kinderh 24 490, 1926). Very early irradiation, they claim, induces abortion quite regularly, whereas later applications seem to retard the normal development of the eyes and brain.

On the other hand, numerous investigators, including A. Doderlein (Deutsche med Wchnschr 54 1997 (Nov 30) 1928), I. I. Kaplan (Surg, Gynec and Obst 50 492 (Feb ) 1930), Martius, Rongy and Rubin, report the birth of healthy children following preconception irradiation of the ovary for functional gynecological disturbances.

I. I. Kaplan (*loc cit*) reports a case of normal twin pregnancy which occurred after a temporary amenorrhea of 7 months, following irradiation therapy.

Doderlein (Deut med Wchnschr

54 1997 (Nov 30) 1928) reports similar cases in which the ovary, after being irradiated so as to suppress menstruation, recovered and produced healthy ova, which became fertilized and developed into normal children

According to Healy, patients with pathologic conditions of the pelvis usually have a diseased endometrium, and as a result do not go to term, if they conceive at all. This writer observed that only a small number of conceptions occurred in patients with non-malignant disease of the uterus, treated by irradiation, and an insignificant number of them reached term.

The Gynecologic Hospital Institute of Gynecologic Research, University of Pennsylvania, has made a special investigation of the effects of irradiation of the pelvis with radium or the x-rays upon the health and development of subsequent offspring. In the first contribution, D. P. Murphy (Surg, Gynec and Obst 47 201 (Aug) 1928) reviewed the world literature of 320 pregnancies reported in women who had received pelvic radium treatment or x-rays during or prior to conception. In a further investigation (*ibid* 48 766 (June) 1929) questionnaires concerning the health of the children born after maternal therapeutic irradiation were sent to more than 1700 leading gynecologic and radiologic observers in this country and abroad. An analysis of these data reveals a total of 625 pregnancies available for study.

Twenty-four per cent of the entire group terminated in abortions. It would thus appear that irradiation had very little effect in increasing or decreasing the abortion rate. When, however, the abortions among irradiated women were grouped accord-

ing to the time of treatment, it was found that the rate was higher when irradiation was instituted after conception had taken place than when it preceded conception.

In the entire series, 76 children (12 per cent) were abnormal at birth. These were divided into two main groups, namely (1) Those who were born after preconception irradiation of the mother, and (2) those who were irradiated while *in utero*.

Of 519 pregnant women who were irradiated prior to conception, 402 children were born at term. Among these full-term pregnancies, 38 children (9 per cent) presented some disturbance of health or defect in development. These malformations were much less serious than those following post-conception irradiation, and did not conform to any one type.

The relative infrequency of such anomalies, together with their lack of uniformity, suggest that in all probability, irradiation was not an important factor in their causation. The author does not maintain, however, that preconception maternal pelvic irradiation is entirely free from danger to subsequent offspring.

Of 106 pregnant women who received therapeutic irradiation with the fetus *in utero*, 74 children were born at term. Among these full term pregnancies, 38 babies (51 per cent) were abnormal at birth. The majority presented serious developmental defects, most frequently in the form of arrested cerebral development, microcephaly.

Various experimental observations have demonstrated the fact that irradiation of animal embryos may result in maldevelopment of the central nervous system which is highly sen-

sitive to irradiation, especially when the embryo is in the earlier stages of development

The susceptibility to irradiation of the rapidly dividing cells of the embryonic central nervous system is the probable explanation of the frequent occurrence of microcephalic idiocy, and other types of arrested mental development. The cells of the central nervous system, undergoing rapid mitosis throughout the entire period of embryonal growth, may be adversely affected in the latter part as well as in the early months of gestation.

The frequency and uniformity of the lesions of the central nervous system observed in the group receiving post-conceptional irradiation seem, according to D. P. Murphy and L. Goldstein (*Am J Roentgenol* 22: 207 (Sept.), 22: 322 (Oct.) 1929), to present almost conclusive evidence that these children suffered because of the irradiation. The fact that seventeen instances (23 per cent) of microcephaly were observed in the 76 full term babies and the infrequency of this form of idiocy in the general population (1 in 10,000 or more births), all strongly indicate that there is a distinct relationship between irradiation and the occurrence of mental defects.

D. P. Murphy (*Surg, Gynec and Obst* 48: 766 (June) 1929) suggests, therefore, that pelvic irradiation be preceded by curettage in order that irradiation of an embryo may be avoided. The pregnant uterus, he claims, should never be subjected to radiotherapeutic exposures. If the presence of an embryo is not discovered until after irradiation, the

pregnancy should be terminated at the earliest possible moment.

To determine the possibility of the transmission of latent defects, a group of 51 albino rats was exposed to heavy ovarian radium treatments, prior to being mated. Those which remained fertile in spite of the treatment, and their offspring were studied. The total first generation of young was 402. Of these, 17 females gave birth to 91 offspring (second generation) after mating with males born of other irradiated mothers. No instance of abortion was observed in either generation.

Following exposure, either sterilization resulted or the irradiation did not alter subsequent conception. No gross structural abnormalities attributable to maternal treatment were observed in either generation (Murphy *ibid* 50: 588 (Mar.) 1930).

**CONCLUSION.**—According to the evidence thus far accumulated, the therapeutic use of x-rays or radium upon a pregnant woman is definitely contraindicated, if there is reason to hope that the pregnancy can be continued to full term. As irradiation of a gravid woman with carcinoma will undoubtedly affect the fetus *in utero*, it is advisable to perform a therapeutic abortion, if the life of the mother might thus be saved. Unusual precaution in the selection of patients for x-rays or radium therapy, with careful elimination of the possibility of pregnancy, are the best safeguards against the birth of an abnormal child.

With regard to the employment of the roentgen rays for the diagnosis of pregnancy, however, the general consensus of opinion is that this is a safe procedure both for mother and child,

since a much weaker current is required for diagnostic than for therapeutic purposes (See also X-RAY AND RADIUM THERAPY—ACTION ON OFFSPRING, in this volume )

**PREGNANCY, TOXEMIAS OF.**—Medical literature is replete of late with chemical research of the blood and urine in the toxemias of pregnancy. Theories, innumerable, have been advanced in explanation of this most important complication of pregnancy which accounts for 25 per cent of the total maternal mortality incident to childbirth. Special emphasis has been placed upon providing a uniform classification of the late toxemias so as to afford a better correlation of the findings of widely separated investigators. Unfortunately, however, there appears to be little new to offer in the treatment of this group of disorders. Closely associated with recent developments in the study of the toxemias are the investigations of Cruickshank and Hewitt, Dieckman, Herrmann, Lazard, Miller and Martinez, Stander, Titus, and Williams. Their painstaking researches have brought forth much valuable information which may lead ultimately to a solution of the problem.

**CLASSIFICATION** — Generally speaking, one may say that the recognition of the different types of toxemia depends on clinical features rather than on laboratory investigations. According to Cruickshank, Hewitt and Couper ("Toxemias of Pregnancy," His Majesty's Stationery Office, 1927), the results of blood analysis show such marked individual variations that it is often impossible to diagnose the type of toxemia from these findings alone. They contend

also that the analysis of the urine has only a limited value because of the difficulty of obtaining a complete daily output.

In a study of 200 cases of toxemia, all the tests of hepatic function which have aroused so much attention were employed by these investigators. They found that none of the tests was of real service in the diagnosis or prognosis. They conclude, therefore, that there exists as yet no sufficiently sensitive or reliable method of examining hepatic function in the toxemias.

Bland employs the following classification in the Jefferson Medical College Hospital: (1) Simple nausea and vomiting, (2) pernicious nausea and vomiting, (3) acute yellow atrophy of the liver, (4) nephritic toxemia, (5) pre-eclampsia, (6) eclampsia. Although the last three types of intoxication occur, as a rule, in the latter period of gestation, they may occur in the earlier months, especially the nephritic toxemia which may manifest itself about the third month.

H. J. Stander (New England J. Med. 201:458 (Sept 5) 1929) offers the following classification of the late toxemias: (1) Vomiting of pregnancy, (2) low reserve kidney, (3) nephritis complicating pregnancy, (4) pre-eclampsia, (5) eclampsia, (6) acute yellow atrophy.

**VOMITING OF PREGNANCY —ETIOLOGY** —The carbohydrate deficiency theory as originally expounded by Harding and Titus is now generally accepted as the most probable explanation of the origin of the vomiting of pregnancy. The incomplete oxidation of fatty acids consequent upon this deficiency is believed to be primarily responsible for the manifestations of this form of toxemia.

**PATHOLOGY**—The urine reveals little abnormal, except a high ammonia coefficient in the severe cases, which is probably the result of starvation

In an investigation of the blood chemistry in hyperemesis, a decrease of blood chlorides is noted together with a slightly increased non-protein nitrogen, uric acid, amino acid and lactic acid content, and a marked accumulation of acetone bodies. Dieckmann and Crossen found the blood sugar well within normal limits and do not agree with P. Titus, P. Dodds and E. W. Willets (*Am J Obst and Gynec* 15 303 (Mar) 1928) who maintain that evidence of most profound glycogen depletion of the tissues is to be seen in the very ill patients

**TREATMENT**—Of paramount importance in the treatment of hyperemesis is the administration of **fluids**. For severe cases of vomiting Titus advocates a period of **abstinence from nourishment or even water by mouth**. An intravenous injection of 300 cc (10 ounces) of a 25 per cent **glucose solution** is given promptly on admission, and repeated 2 or 3 times daily, if necessary. The fluid must be introduced slowly at a uniform rate of not more than 4 cc (1 dram) per minute, thus consuming 1½ hours for the entire injection

The value of insulin is debatable, but one feature in its use is certain—that **insulin** should be given with great caution and, according to Titus, never without glucose

Of great assistance in the treatment is **suggestion**. Occasionally **duodenal tube feeding** must be resorted to

J. P. Gardiner (*J A M A* 91 1937

(Dec 22) 1928) is of the opinion that the vomiting of pregnancy is due to the upright position of the human being and that the **inverted ventral posture** to separate the genital and intestinal tract will effect a cure. He advocates **enteroclysis** as the most rational method of administering fluids

J. W. Williams (*J A M A* 88 450 (Feb 12) 1927) stresses the **removal of focal infection** and irritating gynecological conditions as adjuvant therapy

**LOW RESERVE KIDNEY (KIDNEY OF PREGNANCY, RECURRENT TOXEMIA OF PREGNANCY) INCIDENCE.**—This is the mildest form of late toxemia. It occurs in 5 per cent of all full term pregnancies. In a group of 253 patients with toxemia studied by Stander during 1926 and 1927, 35 per cent showed this form of intoxication

**PATHOLOGY**—There is no antecedent renal damage. The kidney is quite capable of functioning adequately in pregnancy up until about the eighth month

The diagnosis is made when the patient exhibits a moderate rise of blood-pressure 150 mm systolic and 90 mm diastolic, with a small amount of albumin in the urine. A slight edema may coexist. Within 3 weeks after delivery, there is a complete return to normal. This condition is not associated with permanent or progressive injury of the kidneys. Subsequent pregnancies may be similar or normal

**TREATMENT**—Essentially the treatment consists of **rest in bed** with a **low protein diet** and a **restriction of salt**

**NEPHRITIS COMPLICATING PREGNANCY (NEPHRITIC TOXEMIA)—INCIDENCE**—In 3330 deliveries in the Johns Hopkins Hospital there were 61 cases of nephritic toxemia or 2 per cent, with a mortality of 33 per cent. This group constituted about 25 per cent of all gestation toxemias.

**PATHOLOGY**—The occurrence of pregnancy in a woman already suffering with chronic nephritis is a grave complication with the potentiality of producing chronic invalidism or even death. The blood shows distinct pathology with a marked retention of non-protein nitrogen accompanied by a considerable rise in uric and lactic acid. This condition tends to undergo exacerbation earlier and earlier with each successive pregnancy.

**TREATMENT**—Rest in bed, with the free administration of fluids, a restricted protein and a salt-free diet are essentials in treatment. If rapid improvement does not follow, the termination of pregnancy is advocated. Nephritic toxemia is a perilous condition and may provide an indication for contraceptive advice or even sterilization.

**PRE-ECLAMPSIA —INCIDENCE**—According to Stander, pre-eclampsia comprises a small group of not over 5 per cent of all the toxemias. The bulk of the cases formerly treated as pre-eclampsia should fall in the group of "low reserve kidney." Pre-eclampsia, accordingly, is eclampsia before the outbreak of convulsions and coma.

**PATHOLOGY**—The patient is acutely ill with a high blood-pressure and marked albuminuria. Sharp epigastric pain, failing vision and a rapidly rising blood-pressure are

warning signals of impending convulsions.

**TREATMENT**—P. B. Bland and M. Bernstein (Am J M Sc 173 844 (June) 1927) advocate a salt-free diet in the treatment of this type of intoxication. According to these writers, one incident, not without significance, is the loss of weight experienced by patients placed on this restricted diet. This loss is essentially not a loss of flesh, but is due to a fluid loss from the tissues.

Harding and Van Wyck concur in the restriction of salt and also point out that protein and fat cause no ill effects in the treatment of pre-eclampsia. They recommend a total restriction of salt 1 week in every 4.

Williams (*loc cit*) advises that if the pre-eclamptic patient does not improve promptly with rest in bed, a restricted diet and sedatives, she should be delivered as promptly as is consistent with safety to the mother. If the cervix is soft or partially dilated, the modified Stroganoff treatment is begun, followed by the insertion of a bag, without anesthesia. Occasionally Cesarean section under local or spinal anesthesia is performed.

H. A. Miller and D. B. Martinez (J A M A 92 627 (Feb 23) 1929) advocate the use of liver substance (heparmone) in the treatment of pre-eclampsia and eclampsia on account of the ever present liver necrosis found at autopsy. In the mild cases (blood-pressure 150 mm or less), they administer 10 c c (2½ drams) of heparmone intramuscularly, once weekly. This is increased to 3 times weekly in the moderate cases (blood-pressure 150 mm to 175 mm). In severe cases (blood-pressure above 175 mm) 10 c c (2½ drams) are

given 3 times daily. Diet is not restricted. In the eclamptics, 20 cc (5 drams) are given intravenously every 15 to 30 minutes as indicated. Of 255 pre-eclamptic patients thus treated, only 4 developed convulsions. Among 43 patients with convulsions, only 3 died, a mortality of 6.9 per cent.

### ECLAMPSIA — INCIDENCE —

In this country during the year 1927, a total of 4878 women died of eclampsia, the disease accounting for 1 death in every 600 births.

**FACTORS INFLUENCING MORTALITY.**—The London Committee appointed by the Royal Society of Medicine found several factors influencing the maternal mortality of eclampsia. These may be summarized in the following tables:

	<i>Time</i>	Per Cent Mortality
Before labor		20.5
During labor		16.6
After labor		27.6
	<i>Coma</i>	
Drowsiness		5.4
Mild coma		20.4
Deep coma		63.4
	<i>Temperature</i>	
Below 100° F (37.8° C)		5.9
100° to 103° F (37.8° to 39.4° C)		11.2
Above 103° F (39.4° C)		74.3
	<i>Pulse Rate</i>	
Below 90		5.4
90 to 120		9.4
Over 120		40.0
	<i>Blood-pressure</i>	
Below 140 mm		21.0
140 to 200 mm		20.0
Above 200 mm		36.0
	<i>Amount of Albumin</i>	
Small amount (cloud)		8.0
Large amount (heavy deposit)		14.0
Solid on boiling		25.3

	<i>Severity</i>	Per Cent Mortality
Mild		6.4
Severe		32.4
Moribund		100.0
	<i>Edema</i>	
Generalized		16.0
Not present		29.0
	<i>Number of Convulsions</i>	
Below 7		Favorable
Above 12		Unfavorable

In 246 cases the average number of convulsions in patients who recovered was 6.8. The average number in the fatal cases was 12.7.

**PATHOLOGY**—Williams (*loc cit*) found a marked increase in the uric acid content and an increase in the amount of sugar and lactic acid of the blood with a slight increase also of organic phosphorus. The blood sugar values were found to be within normal limits, as a rule, though in some patients definite hyperglycemia was revealed but never a hypoglycemia. In a study of the acid base equilibrium he found a marked disturbance in the oxidative processes, associated with an acidosis. In extreme cases the carbon dioxide combining power was reduced to such an extent as to offer a distinct menace to life from acidosis.

Stander (Am. J. Obst. and Gynec. 13: 551 (May, 1927), in a study of the blood chemistry of eclamptics, found only a shifting in the nitrogen partition plus a decreased chloride excretion and an acetonuria. He also studied eclamptic blood at 5-minute intervals in 8 patients and was unable to corroborate the findings of Titus and Levy who report a hypoglycemia.

P. Titus, P. Dodds and E. W. Willetts (*loc cit*) found that the convulsive seizures occurred at levels

which they called relative hypoglycemia. They hold that the fits are apparently the cause of the sudden drop in the blood-pressure and that following them there is usually a temporary rise in the blood sugar.

Cruickshank, Hewitt and Couper (*loc cit*) found moderate nitrogen retention. The edema present showed no demonstrable relation to the chloride content of the blood or urine.

W J Dieckmann (Am J Obst and Gynec 18 757 (Dec) 1929) states that he has been able to produce the hepatic lesion of eclampsia experimentally. According to his investigations, thrombosis in the liver is unusually prominent in eclampsia. Conditions must exist, therefore, which favor coagulation in the portal capillaries. In pregnancy there is increased permeability of the intestinal wall just as there is increased permeability in the other tissues of the body during this time. Under conditions of excessive protein ingestion protein molecules larger than the amino-acid derivatives and toxic to the pregnant women might be absorbed and become concentrated in the portal circulation. It is likely also that pressor substances are liberated in the blood stream from the intestinal tract, degenerated placenta and damaged liver which may lead to a diminished formation of the anti-thrombin, thereby further accelerating coagulation.

With such a concentration in the blood and especially in the portal system a likely site for thrombosis to occur would be in the small tributaries in the portal vein of the liver, with possibly a resultant eclampsia.

It is noteworthy that during the war the incidence of eclampsia dropped

markedly in those countries affected by the food blockade.

**TREATMENT**—Dieckman (*ibid*) urges the elimination of meat proteins from the diet, an effective daily evacuation of the bowels and the intake of a considerable amount of fluid to avert at least the fulminating types of eclampsia.

P B Bland (M Times 56 288 (Nov) 1928) emphasizes the transcendent importance of prenatal care referring to this as the "Protective Goddess of the expectant mother." Although prenatal care is offered as the best insurance against this disease, the incidence of eclampsia cannot be eliminated entirely.

In an excellent statistical study comprising over 42,000 deliveries, Rice showed that among the patients who received prenatal care, the incidence of eclampsia was only 1 in 1652 cases as compared with a general incidence of about 1 in 200 deliveries among non-supervised patients, or about one-eighth as frequent.

The question of radical *versus* conservative treatment has received considerable attention. E D Plass (M Herald 46 153 (June) 1927) made an extensive comparative tabulation of the radical and conservative treatment of over 10,000 cases of eclampsia in 50 large clinics in the United States and Europe. These tables show that in 4607 patients treated radically, the mortality was 21.7 per cent as contrasted with 11.1 per cent among 5976 patients treated conservatively, a reduction in mortality of nearly one-half in the conservative series.

Herrmann (Zentralbl f Gynak 52 1080, 1928), basing his opinion upon a study of 449 cases of eclampsia which



occurred in 3 Viennese obstetric clinics, favors early and quick delivery per vaginam. Old primigravida and multipara with undilated soft parts near term are delivered by Cesarean section.

Stroganoff relies chiefly upon sedative drugs as chloroform, morphine and chloral and the elimination of all possible external stimuli in the shape of light, noise and manipulation while he allows the patient to detoxicate herself by her own unaided excretory organs. Stroganoff reported a mortality of 17 per cent in 230 cases and later a more recent series of 80 cases with no mortality.

Williams (*ibid*), analyzing 275 cases of eclampsia treated at the Johns Hopkins Hospital, reported a maternal mortality in the conservatively treated cases of 13.3 per cent, and in the actively or radically treated cases of 22.8 per cent. The fetal mortality, however, was the same with both methods, being about 57 per cent.

Williams (*ibid*) employs a modified Stroganoff method of conservatism, using hypertonic glucose solution and omitting chloroform. In 1926 Stander studied the effect of anesthesia on the chemical constitution of the blood. He found that all general anesthetics, *i.e.*, chloroform, ether, nitrous oxide and ethylene, after as short a period as 15 minutes, produced changes in the blood similar to those noted in eclampsia. Thus anesthetics superimpose an added burden on that already existing so that the use of anesthesia may be more harmful than actual radical manipulation.

Williams (*loc cit*) bases his method of procedure on a study of the acid base equilibrium of the blood. When the carbon dioxide combining power

falls to or below 30 per cent by volume, he administers 20 to 25 units of insulin, together with 2 Gm (30 grams) of dextrose intravenously to each unit of insulin (5 to 10 per cent solution).

Titus advocates the use of glucose intravenously but warns against the use of insulin.

E. M. Lazard (*Am J Obst and Gynec* 13:720 (June) 1927) favors the injection of 20 c.c. (5 drams) of a 10 per cent solution of magnesium sulphate intravenously for every patient with a blood-pressure over 150 mm., and repeats this as often as indicated. In 5 years preceding the use of this drug his mortality from eclampsia was 36 per cent. In the years 1924 to 1928 he treated 99 patients with magnesium sulphate with a mortality of 14 per cent. He observed no accidents in 1000 injections. He claims that magnesium sulphate has a sedative effect, reduces cerebral edema and stimulates elimination.

Differences in treatment will probably continue to exist until true light is shed on the etiology of the toxemias.

**PROSTATE.**—In a series of 26 cases, R. D. Herrold (*J A M A* 91:557 (Aug 25) 1928) found that repeated cultures from the seminal vesicles and prostate showed the predominance of the same type of bacteria in many instances. The identity of the organism in succeeding cultures was further corroborated several times by positive agglutination with the patient's serum and the bacteria isolated from the same patient at various times. The author concludes that it is probable that the value of autogenous vaccines in these types of chronic infections of the pros-

tate and seminal vesicles, may be increased if more care is used in the selection of strains for the preparation of the vaccines so as to include the bacterial types agglutinated by homologous sera

O Grant (South M 21 990 (Dec) 1928) advocates the use of a 1 per cent solution of **mercurochrome**, 3 cc (48 minims) injected into the gland. In conjunction with this he uses **massage** and **diathermy**

On the basis of 3 fatal cases of prostatic *abscess* following massage, K Lutz (Deutsche med Wchnschr 54 916 (June 1) 1928) concludes that massage should be abandoned as unphysiologic, unsurgical and dangerous

That prostatic *calculi* have ceased to be a clinical rarity and are of much commoner occurrence than the number of cases reported, is the opinion of B A Thomas and J T Robert (J Urol 18 470 (Nov) 1927). The authors believe that true calculi, whether septic or aseptic, have as a nucleus the corpora amylacea, which are albuminoid or nitrogenous-like bodies. They are commonest in middle life and associated with other pathologic conditions. About 65 per cent are symptomless and are found accidentally during x-ray examinations or upon operations for the prostate. A persistent and rebellious prostate should arouse suspicion of calculi

In a detailed discussion of x-ray therapy in prostatic *hypertrophy*, Rudolph Oppenheimer (Strahlentherapie 29 315, 1929) gives the following summary: (1) Moderate x-ray doses combined with massage of the prostate in the first stage of prostatic hypertrophy ameliorate the irritative

manifestations, especially the frequent strangury, and improve the subjective complaints in a great number of cases, (2) on the other hand, this treatment does not prevent the further development of the malady, particularly the occurrence of chronic retention, (3) x-ray of the prostate can have a favorable effect in cases of prostatic bleeding, (4) small x-ray doses are ineffective in cases of acute retention, (5) any form of x-ray therapy is ineffective in cases of chronic retention, (6) the application of large doses can make an existent cystitis much worse, make more difficult a later necessary prostatectomy and retard or completely prevent wound healing

In a discussion of medical and surgical problems in prostatic *obstruction*, H H Young (New England J Med 199 859 (Nov 1) 1928) reports 27 cases on whom the radical operation was done. Sixty-two per cent were living and without recurrence 5 years later

That age *per se* is never a vital factor in prohibiting surgery of the prostate is the opinion of B A Thomas (Ann Surg 86 563 (Oct) 1927), because modern urology has reduced the mortality rate from 50 per cent to 5 per cent. The author also thus expresses himself: "Operate if you dare to and catheterize only if you must." When possible, operation is better

The **Caulk cautery punch** for *obstruction* of the prostate is discussed by its inventor, J R Caulk (J Oklahoma State M A 21 327 (Nov) 1928), who uses it in at least 40 per cent of cases of obstruction. Of the 75 cases reported, 86 per cent were completely relieved or made comfortable

J H Morrissey (J A M A 90 448 (Feb 11) 1928) believes that *infection* of the prostate, seminal vesicles and pelvic and perirectal areas is related to infection of the ischiorectal fossa because of the distribution of the pelvic fascia and lymphatics. The same author (Surg Gynec Obst 46 341 (Mar) 1928) states that acute suppuration in and about the seminal vesicles and prostate which does not respond quickly to palliative measures, should be given **perineal drainage**. This method is given as the one of choice by R LeFur (Paris chir 20 36 (Mar-Apr) 1928). This author mentions that the rectal route may be used or the hypogastric route when the patient has undergone a prior cystostomy.

In a comprehensive and detailed review of the literature and report of their own cases, A E Goldstein and B S Abeshouse (Surg Gynec Obst 49 477 (Oct) 1929) discuss prevesical, perivesical and periprostatic suppurations. They emphasize post-operative infection and conclude with a summary in which they stress the fact that proper treatment requires early recognition of the fact that the prostatic bed is usually the source of such infection and demands immediate drainage of this area. The **perineal** approach offers the best surgical **drainage** of *suppuration* about the prostatic bed.

**CARCINOMA**—In a report of 40 cases of carcinoma of the prostate, Hans Wildbolz (Schweiz med Wchnschr 58 726 (July 21) 1928) states that 12 cases (30 per cent) lived longer than 3 years after operation, completely free from complaint and without signs of recurrence, so that it might be said that cure has been attained in these

cases. The author states that he could palpate in every one of his operative cases benign hypertrophic glandular portions. He warns that every so-called prostatic hypertrophy must be considered a possible victim of carcinoma, in which early recognition will save the patient's life.

Eleven cases of carcinoma reported by E F Hirsh and L L Schmidt (J Urol 20 387 (Oct) 1928) again emphasize the importance of a microscopical examination of tissues from many regions of the prostate removed with a clinical diagnosis of benign enlargement, in order that small malignant growths do not escape notice.

B S Barringer (New England M J 198 117 (Mar 8) 1928), in a classification of 202 consecutive cases of carcinoma of the prostate with regard to the duration of life after examination and treatment, reports that in but 15 per cent (30 cases) was there any reasonable length of life after the first examination, and in only a moderately small number of these cases of extensive carcinoma was treatment beneficial. The author does a **modified punch operation** in cases with extensive growth.

**SARCOMA**—A case of sarcoma of the prostate is reported by R R Smith and W R Torgerson (Surg Gynec Obst 43 328 (Sept) 1926). They state that theoretically, if diagnosis could be made early, complete **excision** might result in cure, but since symptoms are late in appearing, the condition is hopeless. Other treatments having failed, the use of **radium** is suggested because it has as yet not been given a fair trial and there are no data upon which to draw conclusions as to its efficacy.

**PROSTATECTOMY.**—In a detailed and lengthy discussion of the surgery involved in a prostatectomy, F Hinman (Surg Gynec Obst 49 669 (Nov) 1929) makes a plea in favor of perineal prostatectomy rather than the suprapubic type. The author believes that because of the difficulties in technic of the perineal type, it has not been popular.

F E B Foley (J Urol 22 515 (Nov) 1929) has found that transillumination of the rectum serves as an excellent guide for the division of the recto-urethralis muscle, wherein lies the technical difficulty of the perineal operation. This adjunct permits the already mentioned muscle to be cut close to its rectal attachment, without fear of entering the bowel lumen, and at the same time insures against injury to the external urethral sphincter.

L P Player (J A M A 93 1359 (Nov 2) 1929) calls attention to the fact that frequently, following successful prostatectomy, the patient's general condition is below his pre-operative standard. The author believes this is due to injury and infection of the seminal vesicles and their ducts. In a series of 60 carefully followed cases he found 25 per cent of seminal vesiculitis.

In a discussion of postoperative complications, A H Peacock (J A M A 93 1361 (Nov 2) 1929) reports a series of 117 cases, the mortality of which was 68 per cent. The author states that renal failure, pulmonary infections, urinary infections and embolism are the chief complications and he believes that these complications can be better controlled by giving a longer time to preliminary drainage and preparation.

*Hemorrhage* during prostatectomy is treated by R Stineer (Rev méd cubana 40 711 (June) 1929) by **pressure** with 2 fingers in the rectum and 2 fingers in the bladder, for 2 or 3 minutes, or longer, if necessary. This same complication is given as a cause of poor results by L C Jacobs (California and West Med 28 486 (Apr) 1928) who reports a series of 209 prostatectomies with 11 deaths (5.5 per cent).

V C Hunt (Canad M A J 17 1462 (Dec) 1927), in discussing the immediate and end-results of suprapubic prostatectomy, reviews the results obtained in 995 cases at the Mayo Clinic over a period of 5 years, Jan., 1921 to 1926. There were 42 surgical deaths (4.3 per cent), 91 per cent were materially benefited by the operation. The other 9 per cent, who were not benefited, were patients in whom irreparable injury to the kidneys had occurred as the result of long standing urinary obstruction with persistent and progressive pyelonephritis.

In a study based upon 234 consecutive prostatectomies by Young's perineal and suprapubic prostatectomy for benign and malignant obstruction A B Cecil (Urol and Cutan Rev 32 709 (Nov) 1928) states that the operation is likely to cause a decrease or loss of sexual function in approximately 20 per cent of the cases. In the entire series of cases death occurred in 5 cases (2.14 per cent). In the benign cases the mortality rate was 1.85 per cent.

**PROTEIN THERAPY.**—J H Black (J Lab and Clin Med 13 709 (May) 1928) states that the oral administration of pollen has certain advantages over the hypodermic therapy, treatment

does not require a prolonged preseasonal period, but is entirely coseasonal. Patients can carry on the treatment at home under a physician's direction. No systemic reactions occur. The disadvantages are (1) the materials, in the amounts generally used, are expensive, (2) a small proportion of patients cannot take pollen by mouth because of nausea and abdominal pain, and (3) the percentage of those securing protection is less than with hypodermic treatment and the percentage of complete failures is considerably higher.

W. L. Benedict (Minnesota Med 11 203 (Apr) 1928) observes that in the treatment of **inflammatory diseases of the eye** the generally accepted indications for the use of protein injections are (1) acute or subacute local infections about the eye, (2) chronic constitutional or systemic diseases with secondary inflammations in the eye or adnexa, and (3) prophylaxis. Preliminary tests for protein sensitization can usually be performed. The best results are obtained when a moderate rise of temperature ( $101^{\circ}$  to  $103^{\circ}$  F— $38.3^{\circ}$  to  $39.4^{\circ}$  C) and mild leukocytosis (12,000–18,000 cells) follow 6 to 12 hours after an injection and disappear before 26 hours. The specific proteins used include *diphtheria antitoxin*, *tetanus antitoxin*, *autogenous vaccines* and *tuberculin*. **Sties**, **chalazions**, and **corneal ulcers** respond most favorably to *autogenous vaccines*. Milk, *diphtheria antitoxin* and *typhoid vaccines* are the non-specific proteins generally used. **Acute serpiginous ulcers of the cornea** react to any of these proteins, while **chronic infections of the lids, cornea or uveal tract** respond more readily and more satisfactorily to *milk*. The total benefit of milk injections is usually obtained in 4 injections of from 5 to 10 c.c. are given at intervals of from 48 to 60 hours, 2 injections of typhoid vaccine are usually sufficient for good results, and *diphtheria antitoxins* should be given in moderate doses (2000 to 5000 units) daily as long as desired. After one protein has ceased to be effective, a satisfactory reaction can often be obtained with another. Local treatment of infected eyes is not to be supplanted by protein therapy, but is rather aided by it.

Gerard (Bruxelles-med 9 1402 (Oct 13) 1929) records his experience of treating certain skin diseases by the intramuscular in-

jection of milk preparations incorporating hexamethylene tetramine and termed *lactemine*. The initial dose was 5 c.c. ( $1\frac{1}{4}$  dram) going up to 10 c.c. (2 drams) at intervals of 2 to 3 days. The best results were obtained in the **chronic** and resistant forms of **urticaria**, **psoriasis**, and **chronic eczema**. The milk is employed in the form of whey, which results in a less violent reaction than when whole milk is injected. The reaction is, however, not so feeble as that of auto-hemotherapy, which is less effective in these chronic conditions.

## PRURITUS.—PRURITUS ANI.

—**ETIOLOGY**—Lawrence (Goldbacher (Amer Med 35 287 (May) 1929) states that different investigators have reported certain cases of idiopathic pruritus ani which are due to irritating secretions contained in subcutaneous and submucous peri-rectal channels and tissue spaces.

J. F. Montague (M J and Rec 130 63 (July) 1929) reports 349 cases of pruritus ani and in this number the presence of worms and diabetes were the usual causes. Other causative factors include coloproctitis, fissures, undetected fistulas, hemorrhoids, food allergy, pelvic visceral disease and endocrine disturbances.

**TREATMENT**—After treating other rectal diseases, at present, Goldbacher (*loc cit*) injects 5 to 10 c.c. ( $1\frac{1}{4}$  to 2  $\frac{1}{2}$  drams) of a 5 per cent solution of **phenol** in cottonseed oil into the itching area for the purposes of obliterating these channels and tissue spaces. The injections are made parallel with the long axis of the bowel and about  $\frac{1}{2}$  inch from the anus and  $\frac{1}{2}$  inch deep. From 4 to 8 of these injections are given into the pruritic area.

F. C. Yeomans, R. V. Gorsch and J. L. Mathesheimer (M J and Rec.

130 279 (Sept 4) 1929) classify all cases of pruritus ani into 4 groups (1) those due to a constitutional condition, as diabetes, rheumatism or gout, (2 and 3) those in which pathology of the anal canal and rectum coexist and (4) the so-called idiopathic group. All cases require appropriate general treatment. As local measures, the authors prefer dry applications to lotions or ointments. Their general method of treatment includes (1) **x-ray**; (2) **ionic medication**—in which ions of metallic salts are liberated by electrolytic action, (3) **vaccine therapy**—consisting of autogenous vaccine made from surface culture, (4) **subcutaneous injections**—consisting of injections of quinine and urea hydrochloride, (5) **undercutting operation**—which consists of severing the sensory nerve endings immediately under the skin in the perianal region.

G B Anderson (J Iowa S M Soc 19 286 (June) 1929) recommends ultra-violet ray

H Frank (Deut med Wchnschr 54 1297 (Aug 3) 1928) recommends the free local use of a solution of mercuric chloride

**PRURITUS SENILIS**—J Borak (Strahlentherapie 29 245 (June 30) 1928) regards senile pruritus as a disturbance of metabolism, more especially of the proteins. He states that these proteins and their end products accumulate in the tissues and sensitize the nerve endings, which causes the itching—just as do the carbohydrates in diabetes. He advises irradiation of the hypophysis and the thyroid.

**PRURITUS VULVÆ—ETIOLOGY**—A Castellani (New Orleans M and S J 79 625 (Mar) 1927) believes that pruritus of the vulvæ and

anus is commonly caused by the epidermophyton fungus. In the instances where this is the cause the patient complains of very severe itching, not necessarily continuous, but at intervals, often worse at night, although unbearable itching may occur at any time.

In cases recently infected, inspection is negative except for the usual signs of scratching, but in most cases minute red, slightly elevated, infiltrated patches may be seen on careful examination. In these cases he uses an ointment containing precipitated sulphur and salicylic acid, of each 2 Gm (30 grains), to 30 Gm (1 ounce) of vaseline.

A Labhardt (Zentralbl f Gynak 53 197 (Jan 26) 1929) recognizes 3 causes for this disease: (1) symptomatic pruritus in local disturbances of the vulvæ (vulvitis, maceration by leucorrhœa), (2) ovariogenic pruritus with leucoplakia, (3) neurogenic and psychogenic pruritus.

He believes the itching a consequence of a leucoplakia. Among 27 cases observed by him 18 were in the climacteric and 9 were hypomenorrheic, of this entire group 10 were diabetic.

**TREATMENT**—Otto Hopfinger (Wien klin Wchnschr 41 849 (June 14) 1928) recommends diathermy as a curative agent. In employing diathermy the skin must be intact and free from eczema or pyogenic infection.

R A Sparks (J Missouri M A 26 24 (Jan) 1929) reports a case successfully treated with insulin, even though the urine is free of sugar; this therapeutics is indicated.

Aroya and Roncoroni (Rev méd latino-am (Nov) 1928) state that in-

jections of anesthetic solutions into the epidural cavity at the exit of the sacral plexus will bring about a positive cure

**PSITTACOSIS.**—During the past year numerous case reports have been published from widely separated parts of the world of an acute illness resembling typhoid-pneumonia or influenza-pneumonia which has been traced to an association with birds, usually parrots, and diagnosed as psittacosis. B Heymann (*Klin Wchnschr* 9 193 (Feb 1) 1930) has summarized our knowledge of this condition and reviewed the historical aspects of the disease. Still more recently, A P Thomson (*Practitioner* 124 377 (Apr) 1930) has reviewed the more recently discovered information of a clinical pathological and etiological nature concerning psittacosis.

**INCIDENCE.**—Numerous case reports have come from Germany, France, Great Britain, Argentine, Brazil and the United States. A survey of these reports shows that these cases have certain features in common. 1st, the association of the patients either with sick parrots, well parrots, or with individuals who have been in contact with parrots, 2d, the acuteness of the malady and its tendency to affect the abdominal and thoracic viscera, and 3d, the fact that approximately 30 to 35 per cent of the patients die. Heymann (*loc cit*) in his summary of the literature states that the majority of the parrots come from South America and a few from Brazil. He suggests that the transformation of parrots from their natural habitat in tropical countries and in their natural state to unnatural conditions, being kept in small cages,

in temperate or cold regions, has some influence on reducing the resistance of birds to the infective agent causing this peculiar disease. Von Brehm cited by Heymann, (*loc cit*) calls attention to the fact that in the transportation of parrots from South America and Africa, a great many of the birds die, due presumably to the dark, unsanitary, crowded cages in which they are kept with little or no food, water and air. Even with the improvement of shipping laws and precautionary measures advocated by the authorities, a still large number of birds die in transportation.

The sketchy manner in which this disease is described in medical literature, leads to the conclusion that psittacosis is rare. According to Heymann, Thomson, Hutchinson and others, this, however, is not strictly accurate. These authorities believe that numerous cases occur which are not properly diagnosed, and that many cases interpreted as typhoid fever, influenza, pneumonia or a combination of any 2 or 3 of these conditions, should be surveyed from the standpoint of possible parrot disease in any situation in which the case has been in proximity to birds, especially parrots.

**ETIOLOGY.**—In 1892, Nocard (*Editorial J A M A* 94 189 (Jan 18) 1930) described a Gram-negative motile rod-like, ciliated bacillus found in the body of infected parrots. Since that time, numerous bacteriologists and other investigators have found an organism of this character in cases of psittacosis. H M Perry (*Brit J Exper Path* 1 131, 1920) studied the characteristics of this organism and found that the so-called "*bacillus psittacosis*" closely resembles *bacillus para-*

*typhosus* or *bacillus aertrycke* and *bacillus enteritidis*

In the recent epidemic which occurred in England, S P Bedson, G T Western and S L Simpson (Lancet 1 235 (Feb 11) 1930) investigated a series of 12 patients suffering with psittacosis and 6 parrots which had been in proximity to these cases. In none of these cases were Bedson and his associates able to verify a member of the salmonella group of bacteria, but using experimentally a species of parakeet, the budgerigar, these authorities demonstrated a filtrable virus in the organs of 1 parrot which caused psittacosis to occur in 2 given cases. This virus was able to pass through a Chamberland L1 filter and was also recovered in the organs of the budgerigar. These investigators have proven the virulency of the tissues after being kept for 20 days in 50 per cent glycerol saline in the cold. In a thorough investigation of numerous cases, Thomas was unable to find any bacillus resembling bacillus psittacosis in his thorough study of several patients, and also of parrots. Lewis describes an organism resembling bacillus psittacosis recovered from parrots which, according to him, were responsible for 3 cases of the disease in humans. Sera from 3 patients examined by Thomson gave a positive agglutination reaction to organisms of the typhoid group. One serum was positive to bacillus typhosus and 2 sera were positive to bacillus paratyphosus B.

**SYMPTOMATOLOGY in Parrots**—Wand and Gallagher (cited by Heymann, *loc cit*) described in detail the symptomatology of this disease as found in parrots. Following an incubation period which varied from

3 to 21 days, the bird first exhibits a disinclination to move and refuses to eat. Later, it becomes feverish and about this time diarrhea with foul-smelling, greenish or yellowish and frequently bloody, slimy stools are passed. Not infrequently, vomitus of a frothy, foul yellowish-greenish nature is also expectorated. Practically all of the birds show intense thirst. The feathers lose their brilliancy and may fall out. Due to the dehydration and anorexia, the birds soon show marked emaciation, become weaker, apathetic and sit with drooped heads and eyes closed. The skin, beak and feathers are not infrequently covered with fecal crusts. The majority of the birds die within a week or 2 weeks from the onset of the disease. In the event that the birds do not die within this time, the disease may pass to a subchronic stage, in which the intestinal symptoms become less pronounced and the pulmonary tract symptoms are more prominent.

Dyspnea occurs and rough coarse râles may be heard in the chest. Death results from cardiorespiratory failure.

**SYMPTOMATOLOGY in Man**—The most important point in the history is contact with parrots. The incubation period extends between 5 and 16 days, ordinarily averaging around 9 days. Analyzing the cases described recently in the literature, we are lead to interpret 2 different clinical types.

1 The *pulmonic* group, in which the clinical findings are chiefly of the respiratory tract, the lungs and bronchi, with a profound septicemia. This group constitutes the larger and more



important class and is ordinarily easy to diagnose

2 The *enteric* or *typhoid type*, in which group of cases the symptoms are predominantly of the digestive tract. In parrots and other birds this type of case appears to be rather more prominent and more frequently found proportionally than the pulmonary group. Serological tests in these cases are positive for 1 of the salmonella group of organisms ordinarily.

As previously stated, there are probably a greater number of cases of psittacosis existing, especially those milder cases in which the diagnosis is not made. These cases are classified as mild typhoid or influenza or pneumonia cases. Thomson, Hevmann, Romme, Bedson and many others believe that well-developed cases are frequently missed as well as those milder cases.

**ONSET**—The onset is fairly sudden, as a rule, and the patient may complain of malaise, cough, fever, diarrhea, epistaxis, headache, gas, etc. The development of a sick stomach frequently occurs early, and in about half of the cases, fever up to 104° F (40° C) occurs within the first 3 days. Headache, not rarely found in the occipital region, severe thirst, seldom anorexia, cervical rigidity, nausea, vomiting, indigestion, and diarrhea alternating with constipation are found. The English investigators maintain that epistaxis is not infrequent. They believe it occurs in about 30 per cent of the cases.

Early in the disease, abdominal distention is mild, but as the fever increases, the pulse increases and this distention may become more pronounced. In serious infections, the

patient goes into collapse in 2 to 4 or 5 days. One of the peculiar clinical findings is that of cough with little expectoration and in the large number of cases, especially those reported from Britain, only a few have shown any sputum. Respirations are always increased and in the more advanced cases, these may go up to 40 or 50 per minute. Even with wide spreading involvement of the lungs, these patients suffer slight pleural pain. Thomson (*loc cit*) describes pleural involvement in 2 cases proven at autopsy.

A chief characteristic noted clinically is the bronchopneumonia. This occurs especially about the latter part of the first week. With each new spread or extension, there is an accompanying exacerbation of the fever. Impaired percussion, and sometimes complete flatness may not infrequently be found on physical examination. Complete absence of the breath sounds, due, according to Turnbull, to blocking of the tubes by detritus. In the early stages the spleen and liver are palpable. Rose spots may also appear. Preceding dissolution, delirium and stupor occur. The temperature may fall to within normal limits just before exitus.

The neurological findings are interesting. Parkinsonism has been observed by Thomson (*loc cit*) in the severe toxemia, and R. Hutchison, R. A. Rowlands and S. Levy Simpson (Brit Med J 1 633 (Apr 5) 1930) report photophobia as an early symptom, 1 patient exhibited diplopia. Excitation alternating with depression has sometimes been found.

**CLINICAL PATHOLOGY**—Leukopenia is said to be the rule in cases of psittacosis, although when a

secondary infection occurs a mild leukocytosis (up to 15,000 to 18,000) may be found. Anemia is uncommon. Thomson (*loc cit*) is of the opinion that a strong positive Widal reaction limited to 1 organism of the typhoid group in the first few days of illness, should cause one to think of psittacosis. Blood cultures are rarely positive, and if so they may show the presence of bacillus psittacosis. A mild albuminuria and hyaline and granular casts may be found in severe types of cases.

**PATHOLOGY**—On autopsy the serous membranes may or may not show minute hemorrhages, no exceptional amount of fluid has been found in the body cavities. Catarrhal inflammation of the mucosa of the small and large bowel, with occasional ulceration and marked congestion, may be found. Of the heart, no uniform changes have been observed. The lungs exhibit patchy areas of consolidation with a fibro-cellular, monocyctic exudate filling the small air passages. Congestion also occurs. Turnbull has described the presence of hyaline thrombi in the smaller branches of the arteries in the lungs, but none were found in the veins. A bloody fluid may be found in the larger air passages. The spleen is frequently enlarged, soft, bloody and congested, with total obscuration of the normal structure supporting the organs. The liver may or may not be enlarged. Reimann has found congestion and cloudy swelling. The latter authority has also found a congestive glomerulo-nephritis in the kidneys. Turnbull describes congestion and cerebral edema in the brains of 2 cases which he examined at autopsy.

## DIFFERENTIAL DIAGNOSIS.

—The conditions with which psittacosis are often to be confused, especially in the early stages, are as follows. Some form of typhoid fever, bronchopneumonia, influenza-pneumonia, acute tuberculosis, pyelitis, a severe cold or some form of sinus or other local infection. When the history and association of the patient are sufficiently closely gone into, and it is determined that exposure to parrots occurred, with a fairly rapid onset and development of the symptoms, on exhibition of abdominal or thoracic involvement the condition should not be difficult to diagnose. The principal feature is to think of the possibility of the diagnosis.

**PROGNOSIS**—Recently R. Hutchison, R. A. Rowlands and S. L. Simpson (*loc cit*) in analyzing a series of 27 cases, found a mortality of 20 per cent. They see a relationship of proportional degree between the extent of pulmonary involvement, secondary infection and the mortality rate.

**TREATMENT**—Thomson (*loc cit*) has used small doses of convalescent serum in the treatment of a few cases, and he describes a fall in temperature and some improvement following intramuscular injection. Armstrong of the United States Health Service recently has tried convalescent serum in doses of 50 to 100 c c, but doubts its efficacy. Otherwise, the treatment is symptomatic with sufficient support, frequent feedings, adequate elimination, diathermy over the affected pulmonic fields, ammonium chloride for the cough, oxygen for cyanosis and digitalis when indicated. Up to the present time nothing further has been suggested.

**PSORIASIS. — ETIOLOGY. —**

M Wachowiak, G V Stryker, J Marr, H Bock and M S Fleisher (Arch Dermat and Syph 19 713 (May) 1929) expound the theory that there is a possible relationship between monilia and psoriasis. Of 56 patients with psoriasis 86 per cent showed the presence of monilia in the feces, 17 per cent in the blood, and 36 per cent in skin scrapings.

Experiments to ascertain whether psoriatic patients were hypersensitive to monilia showed that there was distinctly greater sensitiveness than in persons not suffering from the disease. Although no specific relation between the organisms and the disease can be definitely demonstrated, the above-mentioned percentages would seem to suggest a possible relationship.

E Zellner (Wien Arch f inn Med 15 435 (July) 1928) has seen 11 cases of psoriasis accompanied by definite articular disease, all patients had negative Wassermanns and only 2 had had uncomplicated gonorrhea. In psoriatic arthropathy the joints affected are chiefly the wrists, fingers and toes. Ankylosis never occurs. Skiagrams are useful in differential diagnosis.

Pulay (Deutsche med Wchnschr 55 1175 (July 12) 1929) believes that the most important factor in the pathogenesis of psoriasis is pancreatic disturbance. The author advises against x-ray treatment, but he does recommend irradiation of the **endocrine glands**. Though endocrine function has been extensively studied in psoriasis by numerous workers, and the thyroid and other glands have at different times been found deficient, no constant association between the disease and a particular type of

endocrine constitution or abnormal function of any one gland has been established. The author reports that inadequate ferment secretion by the pancreas is comparatively common and considers this as one of the causes of the imperfect disintegration of keratinized cells found in psoriasis.

**TREATMENT.**—R C Jamieson (Arch Dermat and Syph 18 109 (July) 1928) believes that the method of **thymus irradiation**, with or without the use of **thymus extract** internally or by injection, has a place in the treatment of patients with psoriasis which should be recognized.

Mihajlovic (Wien klin Wchnschr 42 1192 (Sept 12) 1929) reports favorable results in the treatment of psoriasis in the employment of an **extract** that was prepared by digesting **psoriatic cutaneous scales** with pepsin and trypsin. The extract is injected subcutaneously.

Noxon Toomey (Urol and Cutan Rev 31 747 (Dec) 1927) has observed 10 cases in which the **gold colloid** preparation alone was employed. It is safe and effective and gives the most permanent results. The treatment is a slow process as the gold must sometimes be taken for several weeks before complete resolution is effected. Locally nothing but **frequent baths, soap friction** and **bland ointments** are used to keep the lesions supple. The author knows of no contraindications to a moderate size dose by mouth or intravenously.

S S Greenbaum (Pennsylvania M J 32 321 (Feb) 1929) states that the local application of **neorobin** is preferable to the old standby, **chrysarobin**.

H Gougerot (Am Med 24 757 (Nov) 1929) concluded that while in

most instances **sunshine** and **ultra-violet rays**, like the **x-rays**, exert a beneficial influence on most cases of psoriasis, it must be borne in mind that this is not invariably so, and as it is impossible to know beforehand whether there exists an idiosyncrasy in this respect, it is advisable to commence the sunshine or ultra-violet rays with the exposure of a limited area

**PSYCHONEUROSES.**—A few authors still cling to the idea that there is an organic etiological basis for the psychoneuroses. N. N. Toporkoff (Progres med 43 1857 (Nov 3) 1928), from a study of 109 cases of *psychasthenia*, believes that congenital syphilis plays an important rôle in its pathogenesis. In all psychasthenic cases, he examines the entire family of the patient for evidence of syphilis. L. Selling (Arch Neurol and Psychiat 22 1163 (Dec) 1929) found definite evidence of focal infection, especially of the antrums, in 3 typical cases of *tic*. All 3 cases showed a very marked improvement when the foci were treated. Although he found that the etiological factors to which tics are attributed commonly—nervous constitution, subnormal mentality and emotional upsets—were present in these cases, the only factor common to all 3 was the infection. He believes that *tic* is an infectious disease, the commonest site of infection being the sinuses, particularly the antrums.

E. J. Warburg and S. Jorgensen (Acta med Scandinav 70 193, 1929) conclude that there is a chronic pathological condition associated with *achylia gastrica* which explains a great many cases of *neurasthenia* and some

cases of early *psychosis*, and that these mental disorders are often associated with mild spinal cord symptoms, glossitis, and megalocytosis. Pernicious anemia represents a rare and late stage in this condition, but not infrequently, a mild anemia may be observed at an early stage.

Neurasthenia is characterized particularly by extreme fatigue and pronounced mental irritability, whereas the psychoses are frequently conditions of imbecility going on to amentia.

Improvement of the condition can be expected in any stage of the disease from treatment with large doses of **hydrochloric acid**, according to Bie's method, and the **liver diet** suggested by Minot and Murphy.

C. W. Dowden and W. D. Johnson (J. A. M. A 93 1702 (Nov 30) 1929), on the basis of the examination of the records of 688 patients, delimit a condition which they call an exhaustive state in contradistinction to more definite neuroses and hypothyroidism, 133 patients complaining of "loss of pep." These showed lowered metabolism and blood-pressure, with slight secondary anemia and slow pulse, which the authors believe is an expression of an exhausted state of the whole individual, rather than any form of endocrinopathy. The majority of these conditions arise from one of the following causes:

- 1 Chronic infection in the upper respiratory and biliary tract

- 2 Mental depression, as the result of marital discord or financial, business and other worries

Unless the etiological factors producing the condition are removed,

no manner of endocrine therapy is of avail

Schilder presents the more generally accepted view, *ie.*, that the psychoneuroses are the reaction of the individual as a whole to his life situation both past and present—in considerable detail. He states that every neurosis has an organic background in the sense that all life has an organic background and consequently every change in the psychic life of an individual must be accompanied by changes in his organism, and goes on to review what is known about the bodily changes in the neuroses and how this knowledge can be used for their interpretation. Vasomotor symptoms and symptoms of disturbance of the vegetative nervous system (disturbed motor and secretory activity of the gastrointestinal and urinary systems) are common in the neuroses but not every neurosis is attended by such disturbances, nor is every one presenting these symptoms suffering from a neurosis. A similar situation is true for chemical and endocrine disturbances and changes in the electrical excitability of the nerves.

The following 2 reports are of interest in this connection

E. P. Boas (Am J M Sc 176 789 (Dec) 1928) states that the positive signs of *neurogenic heart disease* consist of the subjective symptoms of dyspnea, precordial pain and palpitation and the objective signs of tachycardia, instability of heart rate, precordial hyperesthesia and acrocyanosis. Neurogenic disorders of the heart arise from increased activity of the reflex arcs, as a result of excessive or exaggerated afferent stimuli, or of increased irritability of the visceral nervous system of unknown localization, or they may be determined by altered blood distribution caused by neurogenic vasomotor disorders. Successful

therapy depends on the study of each individual patient in the light of his disturbed physiologic processes.

F. S. Kilgore (Am Heart J 5 9 (Oct) 1929) applies the term "*nervous heart*" to a group of disturbances in efferent or afferent innervation of the heart, of which the essential feature is an anxiety neurosis. The efferent disturbances affect the frequency or force of the heart action, and the afferent result in exaggerated perception of the heart action, pain or other abnormal sensation. The symptoms are: Heightened consciousness of heart action, aversion to lying on one side, precordial pain, easy fatigue, breathlessness with slight effort, increased sweating, faintness, tachycardia, and cool, moist cyanotic extremities. The great number of mild cases improve with simple encouragement and a suitable *regimen*. For some of the established cases technical **psychotherapeutic methods** may be needed.

H. L. Bockus, J. Bank and S. A. Wilkinson (A J M Sc 176 813 (Dec) 1928), from a study of 50 cases of *mucous colitis* state that there is little justification, either from sigmoidoscopy or from the character of the mucus discharge, for attributing this condition to inflammation of the colon. Eight patients of the 50 were probably unnecessarily subjected to laparotomy, which reemphasizes the importance of considering mucous colitis as a cause of periodic abdominal pain. So-called mucous colic was present in a minority of cases. The most common situation of the pain is in the lower left quadrant. Many patients did not complain of pain. Constipation is only an associated condition, not an etiologic factor. Twenty-four per cent of these patients had no evidence of constipation. Dyspeptic symptoms were encountered in the majority. Less than half were neurasthenic and very few had definite psychoneuroses. Slightly more than half of the patients were splanchnoptotic and of asthenic habitus. Colon tenderness was present in 66 per cent of cases, being more common over the left colon. Because of a reputed association between dysfunction of the vegetative nervous system and mucus discharge from the bowel, a special attempt was made to investigate this relationship. The authors are of the opinion that the etiology of mucous colitis is in some way linked to the altera-

tions in function of the vegetative nervous system. They do not subscribe to the terms *vagotonia* or *sympathicotonia* as indicating clear-cut and opposed entities, as most of their cases revealed evidence of overactivity of both systems. Symptoms and signs attributed to stimulation of the extended vagus mechanism are more obvious and probably of more importance. Allergy played an insignificant part, if any, in the etiology. Results from the use of calcium combined with parathyroid gland are recorded in some cases.

In this connection, R. B. Tracy (Northwest Med 26 188 (Apr) 1927) states that there has never to come to notice for treatment a *compulsion*, *phobia*, *hysteria*, *anxiety neurosis*, or *neurasthenia* which has not at some time shown a temporary, or more often a permanent, thyroid or adrenal disturbance. The *adrenals* are primarily affected by oversecretion resulting in paralysis of action. The *thyroid* is secondarily affected both by the cervical sympathetic system and the hormone action of the epinephrin in the blood. About 30 per cent of *psychoneuroses* show symptoms of thyroid involvement with evidence of iodine poisoning. Administration of *epinephrin* is only a measure of temporary expediency and must not be permanently continued. **Psychoanalysis** and education of the power of **emotional control** are the only means of permanently restoring adrenal balance. The Arroyo test and Sergeant's white line are the methods relied on by the author for establishing adrenal hypofunction.

Although changes in all these systems may occur in the neuroses, such changes do not explain the neurotic condition. Perhaps these changes can be interpreted better by studying the neuroses and the psychic problems that take place there, rather than by attempting to interpret the neurosis by studying these changes. Every emotion has characteristic change reactions in the whole vegetative system, but no single reaction is specific for the emotion. The whole reaction is the characteristic thing, the emotion itself always con-

taining a living situation, either perceived or imagined, real or represented, or fully conscious or systematically unconscious, plus the attitude of the individual toward this situation. The emotion produces changes in the vaso-vegetative system, but these changes are probably secondary to changes in the psychic make-up, that is, the specific character of the reaction in the vaso-vegetative system will be influenced by the specific problems in the life of the patient which causes the emotion. The task in the study of the neurosis is to find the special situations in the life of the patient that are connected with the change in the vaso-vegetative and endocrine systems. Do life situations in neurotics have a greater influence on these systems than in so-called normally adjusted persons?

It is possible that the neurotic persons are those in whom the physical changes in the vegetative system occur more readily than in the average person, but we must also reckon with the possibility that the neurotic person is an individual who, since childhood, has been under the influence of marked emotions. The organ in question might have been trained in the pathological direction. We have to reckon with the fact that every neurosis consists of a special psychic training in the direction of a special psychic situation, and that the special emotional training in this regard will necessarily have an influence on special vaso-vegetative organs.

It is known from a psychoanalytical and a psychological point of view that every actual emotion simultaneously reactivates the fitting and adequate infantile emotions, and that every emotion of childhood is, in

turn, related to some process in the vaso-vegetative system. The other experiences of life with their emotions tune in as a matter of course. Succinctly, any present emotion sums up all the emotional influences which the vaso-vegetative system has undergone since childhood. The affective value of every event in life is not only determined by the actual event itself, but is also dependent on what has actually taken place in the previous life of the individual. Every experience of life leaves its traces in the vaso-vegetative and the glandular systems of the individual.

The effort has frequently been made to prove the *neurosis of children* as due to conditioned reflexes. If, for example, the child has been frightened by something having to do with the father, perhaps the very sight of the father will again cause fright. This may also spread to all adults who at all resemble the father. This would be a conditioned reflex brought on by experience and the conditioning might become even more efficient if the child had been beaten by the father very often. There can be no doubt that such mechanisms exist, but it is easily recognized that, when studied by psychoanalytic methods, they are better understood than the animal reactions.

Every condition reflex already contains the elements of the psychological problem as its basis. One, therefore, cannot expect to be able to interpret the neuroses by means of the conditioned reflexes. On the contrary, the conditioned reflexes must be interpreted on the basis of the mechanisms studied in the neurosis. Conditioning is a process

which is at least psychic and can only be understood by studying the psychic motivation behind it. In every neurotic action there must obviously be a change in the action of the brain function too. It will, however, be very difficult to say that there is any change in a specific part of the brain structure. It can only be said that the total action of the individual has been transformed and that, along with this change in the action of the individuals, the transpositions or connections in the brain have also been changed. This does not mean that a complete change in one or another function has taken place, but, simply, that the union of function is not what it formerly was. In a normal person all the functions of the brain are in action whenever any attitude is taken or any experience is made. The whole body is, as it were, in tune with the brain. In the neurotic person, on the other hand, one or another part of the brain apparatus may be functioning differently, not necessarily associated with any organic lesion, but rather with the individual's previous experiences. Inasmuch as the brain functions of the normal person and the neurotic individual are not fundamentally different, so there is also no psychic content which is essentially different, it is only that some psychic constellations are somehow more active in the neurotic than in the normal person.

Psychic problems should be considered from a dynamic rather than a static point of view. Changing attitudes towards different situations is characteristic of psychic life. The events of childhood always interfere and determine one's actual experi-

ences One or another infantile experience is always revived by any immediate situation The dynamic relations are influenced by the brain, by the sympathetic nervous system, and by the whole body All psychic experience takes place within the organism and is, therefore, dependent upon it in one respect, while influencing it in another The various apparatuses of the brain are similarly interrelated They are also closely connected with the body as a whole and the vaso-vegetative nervous system Insight into some of these laws has been gained by studying the neuroses from the psychological and the psychoanalytical point of view The same laws operate in all the functions of the organism and organic changes have been found in the neurotic individual which are partly dependent upon the special psychic attitude Changes have been noted in the brain mechanisms of neurotics, as well as in their vaso-vegetative system, the glands of internal secretion, and in the entire metabolism But the study of the psychic life and the experiences of the neurotic individual lead to an even deeper understanding of the neurotic makeup than the study of organic symptoms in the neuroses Psychology and psychoanalysis afford not only a better insight into the psychic life of an individual, but also an approach to the better understanding of the organism

T H Weisenburg (Atlantic M J 31 359 (Mar) 1928) emphasizes a similar view He points out that no neurotic patient should ever be told he has nothing the matter with him, for the mere fact that he comes to a physician is an indication that some-

thing is wrong Many nervous symptoms are the result of marital incompatibility and all phases of the social problem of patients should be gone into and adjusted if possible Most important of all, the personality of the individual should be studied One reason for the success of the old-time general practitioner was the fact that his long period of contact with the family gave him a general knowledge of their separate personalities and afforded an understanding and sympathy which was far more valuable than medicines The use of physical therapy should be emphasized

O K Kankleit (Munchen med Wchnschr 76 1874 (Nov 8) 1929) describes several cases in women, who after a normal abortion became sleepless, depressed, had disturbing dreams, were haunted by the thought of having committed a crime and several had intentions of suicide He considers this condition as an expression of self punishment, a penance for the wrong committed The elaboration of the concept that the need for punishment is a mechanism in the development of a psychoneurosis is one of the most important recent contributions to the theoretical understanding of these conditions F Alexander (The Psychoanalysis of the Total Personality, Nervous and Mental Disease Pub Co, New York and Washington, 1930) states that the attempt to strike a balance between the need for punishment (the claims of conscience) and the desire for instinct gratification is the common dynamic basis underlying every neurosis There are 3 main types of this attempt at equilibrium

1 The claims of conscience (need



for punishment) and those of instinct are gratified at one stroke through the double meaning of the symptom—the mechanism of conversion hysteria

2 The claims of conscience and those of instinct, although met at the same time, receive their gratification through different psychic processes—the mechanism of the compulsion neurosis

3 The claims of conscience and those of instinct are satisfied at different successive periods—the manic depressive mechanism

**PUERPERAL INFECTION.—INCIDENCE**—Notwithstanding the widespread interest manifested in recent years in puerperal morbidity and mortality, this subject still remains the chief concern of the conscientious obstetrician and the principal expression of obstetrical pathology. Although it is a long doleful cry from the septic days of Mariceau, Holmes and Semmelweiss to the septic mortality of 27 per 1000 live births today, the cry is none the less plaintive

Despite all the resources thus far brought to bear, the morbid and mortal aspects of maternity have remained almost stationary for the past two decades. Statistics compiled by the Children's Bureau, United States Department of Labor, indicate that of the more than 2 million full term pregnancies occurring in this country annually, nearly 25 thousand of the mothers succumb

Tragic as the mortal aspects of maternity may be, the statistics of death cover only an insignificant fraction of the toll exacted by childbirth. For every patient who dies, it does not seem too much to claim that 10

are seriously ill, or, in other words, that the annual puerperal morbidity in this country totals not less than 250,000

In the United States from 1915 to 1926, inclusive, the maternal deaths recorded in the registration area aggregated 174,385 and of this number 70,746 or 40 per cent died of that seemingly uncontrollable scourge, puerperal infection

The trend in morbidity and mortality according to the most recent report of the Children's Bureau, is not in the line of improvement, but rather on the decline. In 1915, the death rate in the United States from all puerperal causes was 61 per 1000 live births and in 1925 the rate recorded was 65 per 1000

In 1926 the total mortality for England and Wales was 514 and the sepsis mortality 16 per 1000 live births

The maternal mortality rate in the United States is one-third higher than that of England and Wales and more than twice as high as that of Denmark, Italy, Japan, the Netherlands, New Zealand and Sweden. Although there may be some fallacy in comparative statistics, it is nevertheless undisputed that the death toll from parturition in America is much higher than it should be

The impressive accomplishments of preventive medicine during recent years form some of the most brilliant pages in scientific endeavor, but the child-bearing woman is not benefiting equally with the rest of the population in the improved public health

The maternity situation in various countries, astounding and regrettable as it is, was not until recently fully realized or appreciated. The reaction

to its morbid and mortal aspects is now, however, assuming world wide proportions. In Great Britain an organization has been formed under the auspices of the Ministry of Health, "in an endeavor to successfully counteract some of the evils resulting from midwifery practice." In February, 1928, Queen Mary, in a message sent to a conference on the subject held at Westminster Central Hall, London, proclaimed "Her Majesty views with grave concern the continued high rate of maternal mortality, and feels that a very real endeavor should be made to remove this reproach from our national life."

Plans are being formulated by the Minister of Health of England and Wales to have all maternal deaths and all cases of septicemia studied by an experienced medical officer. This is being done "with a view of ascertaining more precisely the actual causes which lead to maternal mortality in order to provide further means of protection."

The United States at present is, among other things, engaged most zealously in the preparation and dissemination of literature dealing with antenatal care.

**ETIOLOGY**—Of the morbid and lethal triad of childbirth, namely toxemia, hemorrhage and septicemia, it may be said that the latter tops the list in lethal supremacy, claiming more than one-third of all the victims.

There are numerous reasons for this, but the conditions chiefly responsible, undoubtedly are (1) Inadequate antenatal care (2) Indiscriminate vaginal manipulation (3) Injudicious implemental delivery (4) Alluring abdominal delivery (5) The failure to appreciate the transcendent

value of watchful waiting or "the modified Garden of Eden plan."

Vaginal examination and pernicious vaginal manipulation are important contributing factors in puerperal infection on account of (1), the concomitant tissue trauma, and (2) the possibility of directly introducing bacteria from without. Unless performed by men who know how, vaginal manipulation predisposes to a complicated puerperium. It is believed that 75 per cent of the cases of sepsis are associated with repeated internal examination.

The dangers attendant upon vaginal manipulation are well exemplified in figures collected by Bourne of a series of 247 cases of puerperal sepsis from the London Report on Puerperal Sepsis of the last Congress of British Obstetricians and Gynecologists. In this group, 160 patients or 65 per cent recovered, whereas 87 patients or 35 per cent died. A further study revealed that 61 patients, or 24 per cent of those infected, had a normal spontaneous delivery with no apparent lacerations, in contrast with 186 patients or 76 per cent who were delivered by manipulative means.

Manual removal of the placenta exacts a very high toll of morbidity and mortality. In the above group, the placenta was removed manually in 34 instances and 13 patients or 30 per cent died. Similar statistics are reported from Queen Charlotte's Hospital where manual removal of the placenta was performed in 199 patients, with a morbidity of 42 per cent and a 2 per cent mortality.

Placental retention when left alone, on the other hand, seldom gives rise to sepsis. Only in the presence of severe puerperal hemorrhage should

the uterus be explored. The severity of the sepsis depends not so much on the placental remnants as on the invading organism introduced from without.

#### STANDARD OF MORBIDITY.

—Puerperal infection refers to all morbid disturbances resulting from bacterial invasion of the birth canal in labor and in the puerperium. Much confusion on the subject exists, as there is no precise definition with respect to a standard of morbidity.

The Ministry of Health of London proposed a definition of puerperal pyrexia, namely, a temperature of  $100.4^{\circ}\text{F}$  ( $38^{\circ}\text{C}$ ) or more, affecting a woman within 21 days after childbirth or a miscarriage, and lasting 24 hours on end, or occurring once in any given 24 hours.

At the Congress on Puerperal Fever held in Strassburg, Germany, in 1923, it was resolved that all patients be classed as morbid in whom the temperature registers  $100.4^{\circ}\text{F}$  ( $38^{\circ}\text{C}$ ) or more and persists for 12 hours, after the first day.

In the United States a uniform morbidity standard still awaits adoption. The following is a citation of the various standards as employed by different institutions.

(1) The American College of Surgeons has laid down a minimum standard for morbidity, namely, a temperature of  $100.4^{\circ}\text{F}$  ( $38^{\circ}\text{C}$ ) during any 2 consecutive days exclusive of the first 24 hours post-partum.

(2) The standard followed in the Department of Obstetrics, Jefferson Medical College Hospital, is a temperature of  $100.4^{\circ}\text{F}$  ( $38^{\circ}\text{C}$ ) on 2 successive or on 2 different days after the first 24 hours. Under this system, the percentage of morbidity is rarely

below 30 per cent. The percentage for 1927 was 31 per cent.

(3) In the Boston Lying-In Hospital, Newell's standard is  $100.4^{\circ}\text{F}$  ( $38^{\circ}\text{C}$ ) and his percentage of morbidity is recorded as 45 per cent.

(4) The standard followed in the Carney Hospital is also  $100.4^{\circ}\text{F}$  ( $38^{\circ}\text{C}$ ), Phaneuff states his morbidity is 10 per cent.

(5) Ward, in the Women's Hospital, New York, regards every patient as morbid in whom the temperature reaches  $100.6^{\circ}\text{F}$  ( $38.1^{\circ}\text{C}$ ). During the year 1922, with 507 deliveries, the morbidity was 138 per cent.

(6) The standard in the Lying-In Hospital, New York, is  $100.4^{\circ}\text{F}$  ( $38^{\circ}\text{C}$ ) or more on 2 successive occasions exclusive of the first 24 hours. In 1927, with 4871 deliveries, there were 201 patients or 4 per cent classed as morbid.

(7) Bailey, in his service in the Bellevue Hospital, employs a standard of  $100.4^{\circ}\text{F}$  ( $38^{\circ}\text{C}$ ) for 2 days, excluding the first day. His total obstetrical morbidity is recorded as 96 per cent. The morbidity rate for the operative cases is reported as 217 per cent. The mortality rate covering a period of 5 years with 5520 indoor and outdoor deliveries was 0.59 per cent, a most commendable record. Bailey properly believes that the exclusion of both vaginal and rectal examinations during labor reduces the morbidity and in 58 per cent of 4396 indoor patients, no vaginal or rectal examinations were made.

(8) In the Long Island College Hospital, Polak follows the  $100.4^{\circ}\text{F}$  ( $38^{\circ}\text{C}$ ) standard. He reports a morbidity of 59 per cent.

(9) In the Philadelphia Lying-In Hospital, the standard is a temperature of  $100^{\circ}$  F ( $37.8^{\circ}$  C) on 2 occasions after the first day. For the past 3 years, the morbidity has consistently ranged around 29 per cent.

(10) In St. Margaret's Hospital, Pittsburgh, Titus uses the standard followed in the Rotunda Hospital, Dublin, namely,  $100^{\circ}$  F ( $37.8^{\circ}$  C). He reports a morbidity of 20 per cent.

(11) Williams, in the Johns Hopkins Maternity, employs a standard of  $100.4^{\circ}$  F ( $38^{\circ}$  C) at any time during the puerperium except the 24 hours immediately following delivery. His morbidity is reported as 13.56 per cent in white and 25.21 per cent in colored patients.

(12) In the Chicago Lying-In Hospital a patient is regarded as morbid in whom the temperature reaches  $100^{\circ}$  F ( $37.8^{\circ}$  C) on a single occasion from the moment of delivery until the day of dismissal from the hospital. Under this rigorous standard, or as DeLee says, "the strictest of all standards," only 1881 or 11 per cent of the 17,275 patients confined from 1918 to 1925 inclusive, were, he claims, registered as morbid. By estimating the morbidity according to the standards of the British Medical Association, only 801 or 4.1 per cent of the patients could be placed in the morbid category.

(13) P. Findley (Ohio State M. J. 24:773 (Oct.) 1928), of Omaha, Nebraska, employs the standard of  $100.4^{\circ}$  F ( $38^{\circ}$  C). He believes that fully 33 per cent of his patients reach that point by the third day postpartum. His morbidity percentage, he says, he does not regard as excessive, but "an honest to goodness acknowledgment of facts."

From the foregoing, it is observed there is no marked variation in the standard of morbidity employed by the institutions named, ranging from  $100^{\circ}$  to  $100.6^{\circ}$  F ( $37.8^{\circ}$  to  $38.1^{\circ}$  C). The majority seemingly favor a standard of  $100.4^{\circ}$  F ( $38^{\circ}$  C). The variation in the morbidity percentage is the conspicuous feature of this study, ranging from a little over 1 per cent to beyond 30 per cent. With a standard almost precisely the same, differing only in the fraction of a degree, it is difficult to reconcile the vast discrepancy in the morbidity figures reported.

In addition to formulating a conventional standard of morbidity in the United States, there should be formulated a standardization of the principal causes of morbidity. This should be framed in accordance with first, conditions directly causative in the reproductive organs themselves (intrinsic causes) and second, those arising in other structures of the body in the form of intercurrent disease (extrinsic causes). The former should include (1) All forms of septic infection, both pelvic and systemic (2) Traumatic or wound infection (3) So-called lochial retention (4) Mammary infection (5) Phlebitis, always an expression of infection.

#### BACTERIOLOGICAL ASPECT

—The incidence of the various types of puerperal infection can be determined only by a careful bacteriological study.

The question of autogenous infection has caused considerable attention. Until recently it was held that the vagina of pregnant women is comparatively free of the characteristic organisms found in puerperal infection. In the light of present re-

search this view is no longer tenable. A large number of workers have investigated the flora of the normal cervix and vagina and have discovered numerous pathogenic organisms. There has been considerable reluctance, especially by those engaged in the active teaching of obstetrics, to favor auto-infection because of the danger of a relaxation in aseptic precautions. The overwhelming preponderance of infection introduced from without, however, leaves only a small loophole for the conscientious obstetrician to attribute the infection to endogenous origin.

Fitzgibbon and Bigger studied 158 cervical swabs collected from 50 normal gravid patients before, during and after labor. On 104 occasions, streptococci were found, comprising 102 of the non-hemolytic variety, probably saprophytic, and 2 of the hemolytic group. *S. fecalis* was found 43 times, *S. mitis* 42 times, *S. equinus* 10 times, *S. salivarius* 7 times. *S. equi* and *S. infrequens* were each found once, both cultures being hemolytic.

After delivery 27 out of 50 uterine swabs showed non-hemolytic streptococci, but only 2 patients developed a uterine infection.

These investigators also reported 57 cases of acute puerperal fever which occurred over a 4-year period in the Rotunda Hospital, Dublin, with a mortality of 51 per cent. In this series the hemolytic streptococcus was present in 32 cases with a mortality of 47 per cent. The non-hemolytic streptococcus was found in 8 with a mortality of 40 per cent.

Lockhart, in St Thomas Hospital, examined 100 women before labor and found streptococci present in the cer-

vix in 48. Of this group, 9 or 19 per cent had a febrile puerperium. Of the remaining 52 patients in whom no streptococci were found, only 2 per cent developed morbidity in the puerperium.

It appears from these findings that non-hemolytic streptococci may exist in the puerperal uterus without occasioning symptoms. Their significance cannot be studied apart from the question of individual susceptibility. However, they are "opportunists as regards pathogenicity," so that with an increase in virulence, combined with a lowering of the patient's general resistance, infection may occasionally ensue. Sepsis incident to interference and damage during labor is necessarily increased if streptococcal vaginal infection exists prior to the onset of labor.

It is of interest also, to note that the streptococcus pyogenes hemolyticus, responsible for most of the cases of puerperal sepsis, was rarely found as a normal inhabitant of the vagina. To prove definitely an endogenous origin of puerperal sepsis, isolation of this streptococcus from the genital tract of pregnant women prior to labor would be required.

According to L. Colebrook and R. Hare (Brit. M. J. 1 241 (Feb. 8) 1930), the presence of hemolytic streptococci in a uterine culture, although of serious import, does not necessarily justify a grave prognosis. Commonly associated with minor febrile disturbances of the puerperium are *B. coli*, diphtheroid bacilli, non-hemolytic streptococci and various unclassified Gram-negative organisms. Occasionally, however, infection by the streptococcus pyogenes is discovered. E. R. White (M. J. Aus-

tralia 2 38 (July) 1927) reports 1 such infection out of a series of 25 cases of so-called "sapremia", Lucy M Bryce (*ibid* 2 102 (July 28) 1928) found 6 in a series of 50, R R Armstrong and H Burt-White (Brit M J 1 592 (Mar 30) 1929), 8 in a series of 34, and L Colebrook and R Hare (Brit M J 1 241 (Feb 8) 1930), 10 cases of *Streptococcus pyogenes* infection among 134 patients with a mildly febrile puerperium. In the last mentioned series, the cases infected with *Streptococcus pyogenes* were not all of a clinically severe type, and only 1 patient died among the 10.

R R Armstrong and H Burt-White (*ibid* ) found the *Streptococcus pyogenes* occasionally in the absence of any symptoms, but in these cases it was always associated with other organisms. They maintain that the presence of the *Streptococcus pyogenes* in the cervix uteri designates the case immediately as one of puerperal infection to be treated accordingly. They obtained cultures from 153 patients in the various periods of gestation. By employing anaerobic methods they found that streptococci, especially hemolytic examples, could be cultivated more frequently than when aerobic methods were used.

Streptococci were isolated aerobically in 36 cases or 23.5 per cent (12 of the hemolytic variety) and anaerobically in 55 cases or 35.9 per cent (22 of the hemolytic variety). On 8 occasions, streptococci were grown aerobically and anaerobically. The aerobic organisms were non-hemolytic, but the corresponding anaerobic strain appeared strongly hemolytic. The term non-hemolytic streptococcus, therefore, may be misleading. Virulence as tested on animals is, in

their opinion, the only safe guide in identifying the streptococcus with puerperal sepsis.

These workers obtained uterine cultures from 88 patients early in the puerperium. Staphylococci were found in 44 per cent and were, therefore, the most characteristic and frequent organisms. Other organisms chiefly found were diphtheroids, Doderlein's bacilli, enterococci, streptococci and *B. coli*. The *Streptococcus pyogenes* was obtained only in mixed culture. In 9 per cent of the patients the cultures were sterile.

The uterus is rapidly invaded by bacteria from contiguous surfaces early in the puerperium. The period of maximum floral richness in the puerperal uterus is from the third to the fifth day after delivery.

In a group of 12 patients from whom cultures were repeatedly taken for 10 days after delivery, Armstrong and Burt-White (*ibid* ) found the uterus invaded almost at once, positive cultures being obtained in some cases 5 to 6 hours after delivery. This progressive invasion increased until the third day, persisted unchanged to the fifth day and had almost disappeared by the eighth day. This may explain the delay in the development of puerperal fever until the third to the fifth day.

The organisms recovered after labor in the majority of cases of fever, are similar to those found in normal puerperia. After prolonged labor or instrumental delivery, these organisms are capable of minor pathogenicity.

In a group of 41 patients with a morbid puerperium, the number of organisms present exceeded by far those found in normal cases. More-

over, the potentially pathogenic organisms such as the *Streptococcus fecalis* and *B. coli* were found more frequently.

*Streptococcus pyogenes* was present in only 8 patients. In these, the severity of the illness was proportionate to the number of streptococci present. In another series of 20 patients, with serious puerperal sepsis, a pure growth of the *Streptococcus pyogenes* was found in the cervix in 19 cases. The writers named believe, therefore, that in cases of severe puerperal sepsis, the *Streptococcus pyogenes* is almost universally present in pure culture in the cervix and in the majority of cases in the blood also. Slight puerperal morbidity, on the other hand, may show a preponderance of other organisms.

In their experience, the *Streptococcus pyogenes* is the most common cause of serious puerperal sepsis, followed in order of severity by *B. coli*, *S. fecalis* and *Staphylococcus hemolyticus*. The cervical swab, they claim, is of the same value in the diagnosis of streptococcic puerperal sepsis as is the throat swab in diphtheria.

J. W. Harris and J. H. Brown (Bull. Johns Hopkins Hosp. 40: 203 (Apr.) 1927) examined the vaginal flora of 168 patients and found streptococci in 117 or 67 per cent. One hundred and sixteen strains of streptococci were isolated from 113 patients, 24 being of the aerobic beta-hemolytic type. The latter organism they believe to be the etiologic factor in the majority of fatal cases of puerperal infection and are always of exogenous introduction.

Almost one-half of the aerobic streptococci were beta hemolytic and of these the majority belonged to the *Streptococcus pyogenes* group. The

majority of the anaerobic streptococci were of the gamma type. They found gamma non-hemolytic streptococci, both aerobic and anaerobic, present frequently in the vagina and cervix of normal non-pregnant women. These they believe may become pathogenic after delivery, i. e., auto-infection may develop. The gamma type was found 5 times more frequently in the colored race, due perhaps to poor hygiene or poor resistance.

These workers took 30 uterine cultures on the fifth day of the normal afebrile puerperium and found only 10 sterile, though none contained streptococci. They do not believe that streptococci can exist in the puerperal uterus for any length of time without giving rise to clinical manifestations.

H. Schottmüller (Munch. med. Wchschr. 75: 1580 (Sept. 14), 1634 (Sept. 21) 1928), of Hamburg, states that the *Streptococcus pyogenes hemolyticus* is the most dangerous organism in puerperal infection and is responsible for most epidemics. It is introduced from without and was found in one-third of his fatal cases.

In 1903, Schottmüller, having observed that many cases, definitely infectious, gave negative cultures, grew his cultures anaerobically. In 1910 he first described this anaerobic organism and termed it *Streptococcus putridus*. A characteristic property of this anaerobe is that the pus or blood in which it grows has a very foul odor due to the formation of hydrogen sulphide. *Streptococcus putridus*, he claims, is often the cause of serious and fatal infection. With the *Streptococcus pyogenes* it is frequently associated in cases of prolonged thrombophlebitis. In 1928, in a re-

view of the entire subject, this investigator (*ibid*) claimed that many anaerobic organisms are harbored in the vagina, especially the *Streptococcus putridus* and gas bacillus. These, therefore, may give rise to auto-infection in contradistinction to the hemolytic streptococci and various types of staphylococci which are nearly always introduced from without.

In 231 fatal cases of puerperal sepsis, Schottmuller (*ibid*) found the *Streptococcus putridus* present 72 times. It was present 7 times in mixed infections. This observation is contrasted with its occurrence in 600 infected abortions in which it was found in pure culture only 4 times, though it was found 300 times as a mixed infection.

O. H. Schwartz and W. J. Dieckmann (Am J Obst and Gynec 13:467 (Apr) 1927) have confirmed the findings that anaerobic streptococci play an important role in puerperal infection. In addition, they have also isolated several other strains of anaerobic streptococci. In most instances the infection caused by these organisms remains confined to the endometrium and few patients develop thrombophlebitis.

Harris and Brown (*loc cit*) found anaerobic streptococci and aerobic organisms, with almost equal frequency. This emphasizes the necessity of anaerobic methods of culture in suspected cases of streptococcal puerperal infection. The majority of anaerobic streptococci are of the gamma type.

The workers just referred to examined the bacterial content of the uterus immediately following Cesarean section. In cases of elective section the contents of the uterus were

sterile in every instance. In patients who had been in labor from 6 to 19 hours anaerobic streptococci were found in 3 instances.

In patients on whom the low cervical operation was performed, after a labor of from 11 to 55 hours, the uterus was infected in practically every one, and anaerobic non-hemolytic streptococci were cultivated in over two-thirds. This suggests the possible influential rôle of anaerobic streptococci in infection arising after Cesarean section.

These investigators have also isolated strains of an anaerobic organism (*Act pseudo-necrophorus*) which, they believe, may be a factor in the causation of puerperal infection. Because of its strict anaerobic requirements and its sensitiveness to brief exposure to the air, its presence in the genital tract has probably been overlooked. They found it in 6 instances, once at autopsy, in 2 instances in ill patients, and in 3 uteri cultured out of a series of 50 Cesarean sections. In the latter, the incision broke down and discharged foul pus. This organism is potentially harmful to the human, although it is not so pathogenic to laboratory animals.

B. P. Watson (Am J Obst and Gynec 16:157 (Aug) 1928) reported an epidemic of puerperal sepsis occurring in the Sloan Hospital, New York. During the period from January 16th to February 14th, 1927, inclusive, 24 patients, out of a total of 163 delivered, developed streptococcal infection and 8 or 33 per cent died. Another died later. One baby died of erysipelas. One nurse had a severe streptococcal infection of the arm and recovered. Another developed a



primary streptococcus peritonitis and recovered after laparotomy

Infection continued to occur after the operating room and delivery rooms had been treated with chloride of lime and even after the delivery room was changed. It ceased only after no further patients were admitted.

A bacteriological investigation of this epidemic by Meleney and his co-workers revealed that the organisms did not enter the patients by the portals of the nose or throat, nor was the infection hematogenous. Organismal invasion took place either just before, during, or directly after delivery. The portal of entry was the vagina. Hemolytic streptococci were found in the lochial discharge of all but 1 infected patient. The organisms were probably conveyed to the patients by 1 or more carriers. Streptococci were demonstrated, other than in the infected patients only in the nose and throat of attendants. The late appearance of streptococci in the blood of most of the patients and the post-mortem findings indicated a lymphatic dissemination.

The conclusion reached was that a highly virulent streptococcus had invaded the hospital, probably by the nose and throat or hands of the attendants.

J. R. Goodall and M. Wiseman (Am. J. Obst. and Gynec. 16:339 (Sept.) 1928) believe that chronic endocervicitis and cervicitis are the underlying causes of most of the mild cases of puerperal morbidity. They found a cervical lesion present in the majority of 145 patients showing a febrile puerperium. They frequently observed a thin delicate streptococcal membrane covering the external os and cervical canal. In 5 per cent of

all cases they obtained positive streptococcus smears.

Eighty per cent of parous women were found to have endocervical lesions of a catarrhal nature which, they point out, may readily lead to infection through trauma sustained in subsequent labor.

**BIOLOGIC ASPECT.**—Considerable work has been carried on with reference to the biologic problems relating to sepsis, though little knowledge has thus far been gained.

Aside from the defensive qualities of the patient and her blood, 4 lines of defense against bacterial invasion are believed to be active: (1) The protective zone in the decidua, (2) the phagocytic infiltration of the uterine wall, (3) the cellular defense in the parametrium, and (4) the whole reticulo-endothelial system, including the endothelial elements of the lymph and blood spaces throughout the body.

J. Horbauer recently pointed out the cellular defense of the parametrium. He demonstrated specific types of cells in the cervix, lower uterine segment and more particularly in the parametrium in the bases of the broad ligaments. Immunologists agree that the leukocytes are not the only phagocytes found in the human organism. Reticulo-endothelial cells and the new mesodermal cells produced by inflammation are particularly active in phagocytosis, taking up bacteria, fragments of cells and tissues, red blood cells and other tissues.

The parametrium is made up of dense fibrillar connective tissue with some muscle and a few cell elements. In pregnancy these cell elements increase rapidly in number and arrange themselves along the course of the

lymphatics accompanying the blood-vessels. In the presence of infection the parametrium abounds in specialized cellular elements, with monocytes and clasmatocytes predominating. An artificial means of stimulating the parametrial tissue, thereby increasing phagocytic development, would be highly desirable.

**FACTORS CONCERNED IN PROGNOSIS**—A painstaking bedside study supplemented by a thorough laboratory investigation usually affords sufficient data for the experienced obstetrician to render a prediction as to the outcome of a given case of sepsis. Numerous factors enter into the prognostication.

(1) *Causative Organism*—Since the *Streptococcus pyogenes hemolyticus* is responsible for most of the serious infections, its presence as the dominant organism denotes a grave condition of either a general sepsis or a severe localized pelvic infection. When other organisms predominate the outlook is more favorable. It is impossible, however, to particularize, since the disease is so protean in its manifestations.

A positive blood culture is more likely to preclude recovery, but is not necessarily fatal. In Bourne's series of 136 cases the mortality in 79 patients with a negative blood culture was 20 per cent, in contrast with a mortality of 66 per cent in the 53 patients in whom streptococci were recovered from the blood stream. The condition of a patient is especially critical if the organism recovered fall within the group of the *Streptococcus pyogenes*, the staphylococcus, the *Bacillus coli* or the *Bacillus aerogenes capsulatus*.

(2) *Number of Bacteria per c c of Blood*—If the bacteria are numerous

and easily discovered by ordinary cultural methods, the prognosis is more unfavorable than if they are few in number and only occasionally discovered after several tests. According to L. Colebrook, if 10 to 15 streptococci per c c of blood are present, the outlook is promising. If 15 to 50 per c c are discovered, the outlook is very grave, while more than 50 organisms per c c usually indicates a fatal termination.

(3) *Onset*—The earlier the fever begins the more ominous is the outlook. If the infection is ushered in early in labor, or within 36 or 48 hours after delivery, the disease is serious. An analysis of 230 cases by Bourne disclosed that of 28 patients who developed fever on the day they were delivered or the first day thereafter, 60 per cent died. This is contrasted with a 37 per cent mortality in those patients in whom the temperature did not rise until the third day, and a 26 per cent mortality in those with the onset of fever on the fifth day.

It is of interest to note that single chill occurring immediately after the onset of pyrexia in this series indicated grave disease. Repeated rigors, however, were of only moderate significance and less ominous than none at all.

(4) *Type of Fever*, continuous *vs* high peak and low point—Continuous high fever from the outset is an unfavorable symptom, as is also extreme prostration, both usually indicating an invasion of the blood stream. Remittent fever is much less serious.

(5) *Pulse Rate*—A rapid pulse denotes a grave toxemia. If the pulse rate remains below 110, a patient will

rarely die (about 4 per cent mortality) Similarly a pulse with volume and force is less serious than a running or diminishing pulse, one that presages cardiac degeneration and usually terminates fatally If the pulse goes above 150, the prognosis becomes exceedingly grave (over 80 per cent mortality)

(6) *Resistance*—The previous constitutional state must be ascertained before forming an opinion as to prognosis Much depends on the condition of the heart, lungs, kidney and liver The immense value of inherent resistance of a patient to bacterial invasion is well recognized, but little understood Exhaustion of a prolonged labor, lacerations in delivery, as well as hemorrhage, may undermine this defense and seriously diminish the patient's chances for recovery

**TREATMENT**—The solution of the problem of an unchanged incidence of puerperal sepsis for the past 2 decades or more has not been obtained An unbiased inquiry into the cause of every maternal death in childbirth, septic or otherwise, is highly desirable and might prove a dynamic means of reducing the inordinately high death rate now prevailing in the United States

**PREVENTION**—In the field of puerperal infection one finds the greatest opportunity of practising prophylactic medicine Prevention of infection is now being proclaimed and more zealously practised than ever before, because it is believed that 75 per cent of the cases of sepsis fall within the realm of prevention

This feature of the subject has already been considered in the paragraphs dealing with the causes of

puerperal infection Briefly, they may be summarized by emphasizing the woeful results that follow inadequate antenatal care, injudicious vaginal examination, unnecessary haste and indiscriminate operative procedures both vaginal and abdominal and the failure to recollect that the most skillful obstetrician of all is "Nature" herself

An intensive educational campaign may be instrumental in effacing the stigma now clouding the obstetrical horizon This would embrace the scientific society, the teacher of obstetrics, the general practitioner, the medical student and finally the public itself

Local pelvic diseases should be eradicated in the antenatal period The elimination of foci of infection, and the advocacy of local cleanliness and abstinence from coitus, will do much to forestall future morbidity

Zweifel advocates **douches** of one-half per cent **lactic acid** in pregnancy to change the pathologic vaginal secretion and reduce the percentage of morbidity

Goodall fills the vagina with a 2 per cent **solution of mercurochrome** daily for the first 7 days of the puerperium as a prophylactic measure

Similarly **antistreptococcic serum**, **vaccines** and even **tetanus antitoxin** have been used to counteract the invasion of bacteria introduced during labor

A rigorous aseptic technic must be maintained during all stages of labor Too vigorous attempts to remove the placenta by Crede's method, or manually are to be condemned Unavoidable puerperal wounds should be promptly repaired

The strict application of all aseptic

principles employed in surgery should be embodied in every delivery, a practice in itself that would inevitably curtail the prevailing high morbidity and mortality of childbirth

**SPECIFIC THERAPY**—It is not possible to measure accurately the value of any one method of treatment in puerperal sepsis, because many patients will recover without any form of medication at all, while on the other hand, a certain number will inevitably succumb in spite of any plan of therapy. The study of the literature indicates that more and more reliance is being placed on good nursing and "common sense doctoring." It has been found that in the long run, **rest, generous feeding, an abundance of fluid, fresh air and sunlight** will prove more helpful than any drug or chemical so far advocated and administered. The enormous array of methods recommended, and the diversity of opinion as to their relative merits, render it exceedingly difficult to set forth any preferential mode of treatment.

The London Committee, in its report, refers to 60 different methods or combinations of methods employed in the treatment of 249 cases. These included the following: General medical care, postural drainage, vaginal and intra-uterine irrigations, the administration of anti-streptococcic serum, vaccines, colloidal iodine, colloidal silver, quinine, saline, blood and immun-transfusions; saline and bicarbonate solutions by the bowel, the intravenous administration of eusol, mercurochrome, mercurosol, perchloride of mercury, anti-diphtheritic and bacillus coli serum.

In America, the compounds chiefly employed in intravenous treatment

are mercury, arsphenamine, mercurochrome, gentian violet, antistreptococcus serum, metaphen, Pregl's iodine and whole blood. None of the agents named, however, have seemed to control the disease in anything like a specific sense.

J O Polak (Am J Obst Gynec 17 467 (Apr) 1929) believes that repeated small blood transfusions, combined with good nursing and generous feeding, afford the most effective means at hand.

Schottmuller (*loc cit*) favors a very abundant fluid intake, either subcutaneously or rectally, but not intravenously, owing to the deleterious influence it may have on an already weakened heart. He believes a slow infusion will aid in maintaining vital resistance. Cardiac stimulants are given if necessary, but antipyretics, vaccines and sera he does not recommend. He believes that it is possible, however, that an effective serum, similar to that now used in scarlet fever may be forthcoming.

Burt-White has tested the therapeutic effect of scarlet fever antitoxin serum and reports beneficial results.

Findley (*loc cit*) does not approve either of serum or vaccine therapy, though he does favor immun-blood transfusions.

L Colebrook and R Hare (Brit J Exper Path 8 109 (Apr) 1927) have shown by experimentation *in vitro* that human serum treated with mercurochrome-1 10,000 had no bactericidal effect on either staphylococci, or hemolytic streptococci. Moreover, they found that defibrinated human blood was more deadly to staphylococci than the same blood treated with a 1 10,000 solution of the chemical just named.

From their studies, one seems to be justified in assuming that any chemical transfusion of the blood stream may do more harm than good, first, by destroying the leukocytes, and thereby the phagocytic power of the blood, and second, in some peculiar way, altering or combining with the blood itself, and thus providing a favorable culture medium. The investigators referred to, do advocate **immuni-blood transfusion**, prepared and administered as follows. The donor's blood is immunized by injecting subcutaneously one thousand million staphylococci. Four hours following the injection, the blood of the donor, it is claimed, has an exalted germicidal property and is then ready to be administered. Because the object of the injection is to obtain a larger amount of the "non-specific" antibodies, the use of staphylococci is permissible, whatever may be the infecting agent in the patient. The increased hemo-bactericidal power of the donor's blood, it is said, is lost after a lapse of about 48 hours.

**SURGICAL TREATMENT.**—The question of conservative as opposed to operative treatment still evokes considerable discussion, though most observers consider and favor the conservative plan. Generally speaking, intra-uterine manipulation, such as irrigations, medicated packing and curettage are not looked upon with approval. Invasion of the uterine cavity either manually or instrumentally, even in the presence of retained material, unless associated with hemorrhage, most writers contend, only courts further trouble. Manipulations of any kind, within the uterine cavity may destroy Nature's

barriers of protection and disseminate, thereby, the infectious process.

DeLee refers to 25,560 full term deliveries. Ten per cent of these patients had a temperature exceeding 100° F. (37.8° C). In only 1 was the uterine cavity invaded. In the others, no local measures were practised. Only 9 of the patients died, and 5 of these had received questionable treatment in other hands. In none of the patients did their subsequent course show that the result might have been different, had a more active policy been pursued.

All in all, it seems prudent to say that only in frankly localized collections in the pelvis, or in the other structures concerned, is operative interference indicated. **Hysterectomy** is still advocated in certain cases by Baldwin, but it must be acknowledged that it is exceedingly difficult if not almost impossible, to judge definitely those cases suitable for a so radical procedure.

**Ligation of the broad ligament veins**, with the view of inhibiting venous thrombosis, is also mentioned as a therapeutic recourse, but this has not received favorable commendation.

J. O. Polak (Am J Obst Gynec 17:467 (Apr) 1929) for example, has studied this method of treatment and has found that 60 per cent or more of patients with pelvic thrombophlebitis recover, if all types of pelvic manipulation are avoided. Surgery, even in his expert hands, has carried a mortality of 100 per cent. In 182 operative cases collected from the literature, there were 94 deaths, or a gross mortality of 51.6 per cent. This group included 111 cases, which were looked upon as favorable surgical

risks, and 34 of these died, a mortality of 33.9 per cent.

B. C. Hirst reports a series of 37 cases treated along conservative lines with a mortality of 13.5 per cent, and Polak, 63 cases treated by similar means, with a mortality of 30 per cent.

Directly opposed, however, to the foregoing, are the recommendations of Schwartz and Dieckman (*loc cit*). They believe that infections due to anaerobic streptococci remain confined to the uterus, and that this type of infection is rarely accompanied by secondary involvement of the broad ligament veins or pelvic thrombophlebitis. In the presence of foul discharge, the writers just referred to, approve of the early removal of retained material, either by digital means, or by curettage. Either procedure is followed by irrigating the uterine cavity with a solution of potassium permanganate, 1 to 4000 dilution. They also favor ligation of thrombosed pelvic veins.

Schottmuller (*loc cit*) likewise commends emptying the uterus by means of a dull curette, provided the infection is confined to that organ.

If it were possible to destroy all bacteria within the uterus by chemical means, without at the same time injuring the uterine wall itself, the procedure would make an impelling appeal. But, it is generally conceded that this is beyond accomplishment.

With this end in view, accordingly, Hobbs advocates the injection of glycerine into the uterine cavity. This is done by introducing an ordinary vaginal speculum and exposing the cervix. A soft rubber catheter is carried into the uterus and through this the glycerine is introduced. By

virtue of the hygroscopic property of glycerine, it is believed, the flow of bactericidal lymph is drawn from the wall of the uterus into its cavity. Theoretically, this method seems less objectionable than the use of ordinary antiseptic douches.

Finally, a study of the literature indicates that observers more and more are supporting the conservative plan, basing their contentions on the assumption that all forms of general or local manipulation retard, rather than enhance the protective forces called forth by nature herself.

**PURPURA.—PURPURA HEMORRHAGICA—ETIOLOGY**—Gregory (Brit J Child Dis 25:180 (July-Sept) 1928) suggests some primary inflammatory lesion of the spleen and its covering peritoneum as a possible cause of the disease. For example, he reports a case where adhesions were present holding the spleen firmly to the abdominal parietes. After splenectomy the child was much improved.

**TREATMENT**—A. W. Spence (Brit J Surg 15:466 (Jan) 1928) remarks that splenectomy was performed for purpura hemorrhagica on the assumption that the hemorrhages were the result of the reduction in the number of blood platelets caused by the destructive action of a diseased spleen. It is thought that the prolongation of the bleeding time is due to a defective quality of the platelets rather than to diminished numbers. The transfusion of citrated blood in these cases results in a fall in bleeding time to normal and a temporary rise in the platelet count. Purpura hemorrhagica may be divided into acute and chronic cases, splenectomy is

beneficial in 80 per cent of the chronic and 16 per cent of the acute cases

J Quénu (Rev de chir 67 24, 1929) found that the results of **splenectomy** seem to depend on the degree of the involvement of the spleen, good results are observed in patients with disturbances predominating in the spleen, whereas less satisfactory results are observed in patients with disturbances involving the whole reticulo-endothelial system, and, finally, splenectomy is of no avail in patients with disturbances predominating in the extrasplenic part of the reticulo-endothelial system

H Engel (Med Klin 24 888 (June 8) 1928), in discussing blood transfusion in thrombopenic purpura, concludes that **blood transfusion** does not act as an "alterative" therapy, with stimulation of the megalocyte, nor as a substitution treatment in respect to blood platelets, but mainly as a substitution treatment in respect to erythrocytes. The transfused platelets perish rapidly. The transfused erythrocytes serve to tide the patient over the period of danger till thrombopoiesis starts again. The styptic action is perhaps due partly to products of platelet decomposition, partly to parenteral incorporation of large quantities of serum protein

**PATHOLOGY**—Lemoine (J de Chir 27 202 (Apr 28) 1928) reports a case of purpura hemorrhagica in a girl aged 9, with increased bleeding time and a decreased number of blood platelets. After **transfusion** and **splenectomy** the hemorrhages stopped, the bleeding time returned to normal and the number of blood platelets increased

Kidd (Proc Roy Soc Med (Sect

Urol) 21 19 (Apr) 1928) has recently recorded 24 cases of hematuria where he has been able to demonstrate by cystoscopic or direct examination numerous petechiæ on the mucous surface of the bladder or in the pelvis of the kidney

W K Hunter (Lancet 2 1327 (Dec 29) 1928) states that at the present time it seems more judicial to view the platelet count in much the same way as we do the leukocyte count. Leukopenia may be a symptom of disease, but not its cause, and the same may apply to thrombopenia

**FAMILIAL PURPURA —DIAGNOSIS**—G R Minot (Am J M Sc 175 301 (Mar) 1928) records that there exists a chronic familial hemorrhagic condition characterized by a prolonged bleeding time in the absence of a decrease of blood platelets and a delayed coagulation time of the blood. Multiple ecchymoses and recurrent epistaxis are characteristic symptoms. Pathologic blood loss and abnormal bleeding time may be present at 1 time and not at another, but their occurrence is not necessarily synchronous. This hemorrhagic condition appears in infancy and may extend into adult life, but then its severity tends to decrease and the condition may disappear as the patient grows older. Its etiology, the reason for the prolonged bleeding time, and the tendency for this to be demonstrable intermittently, remain obscure

**HENOCH'S PURPURA —ETIOLOGY**—F Chevallier and J Bourgeois (Bull méd 42 479 (Apr 28) 1928) state that the cutaneous manifestations of the gonococcic septiciemias have a marked tendency to become purpuric. A characteristic of

these purpuras is that they occur towards the end of the disease. This fact at once establishes the cutaneous lesions to be of gonorrheal origin.

E Goldstein (M Clin North America 12 869 (Nov) 1928) states that Schonlein-Henoch's purpura appears to be a condition of the blood capillaries in which these vessels are dilated, lengthened, and distorted. The whole clinical picture may be explained by the action of a toxic substance of food or bacterial origin, histamin or a histamin-like body, on the capillary bed. In some respects the condition resembles an anaphylactic reaction. The condition is most common in females and in the second decade of life. It differs both clinically and hematologically from the thrombocytopenic purpura.

The *prognosis* is usually good, but the gastro-intestinal or renal complications may prove fatal. **Surgical intervention** may be indicated in case of intussusception or perforation of the bowel.

Alexander and Eyermann (Arch Dermat and Syph 16 322 (Sept) 1927) present a series of cases illustrating what they believe to be aspects of food allergy associated with gastric and intestinal hyper-peristalsis, localized edema and purpuric lesions on the skin. These writers (J A M A 92 2092 (June 22) 1929) also report the study of 6 cases in which abdominal pain had been identified with allergy. In each instance it was demonstrated that the lesions were caused by the ingestion of particular food-stuffs.

**PYELITIS.**—The kidneys in 114 cases of pyelitis and pyelonephritis have been studied by A G Gibson

(Lancet 2 903 (Nov 3) 1928), who divides them into 2 groups (1) Those with no obstruction, 72 cases, (2) those with obstruction, 42 cases. He concludes from his findings that by far the most common infection of the kidney substance in man is an infection through the blood stream. This type is found in 77 per cent of all cases of renal disease whether urinary obstruction is present or not.

From a study of the clinical records of these cases, he found that pyonephritis may occur (1) as mild attacks which pass without notice or perhaps with only slight discomfort, (2) moderate attacks which are attributed to what is ordinarily termed "acute pyelitis", (3) septicemic attacks simulating typhoid or other grave conditions, and (4) fulminating attacks in which the kidney may become gangrenous and death is imminent.

Pyelitis, an inflammation of the inner lining of the pelvis of the kidney, is ordinarily considered a common lesion, but the author found that in purulent and semi-purulent infections of the kidney it was very uncommon in the absence of obstruction, though it occurs in about 50 per cent of the cases when obstruction is present.

The state of the urine varies considerably in pyelitis and pyelonephritis. Frequently it gives very little aid in the diagnosis, and in some instances the absence of abnormality in the urine may divert attention from the kidney even when there is a localized purulent infection of that organ. This is apt to be true especially in cases of acute infarctions in the cortex.

Renal infection, as seen in 50 cases



selected from a series of 100, is discussed by G C Smith (New England J M 200 867 (Apr 25) 1929). The possible causes of the condition were infected teeth and tonsils and gastrointestinal disturbances such as colitis and duodenal ulcer. Thirty-five of the patients were females. In 27 cases, the condition was chronic.

The typical *acute* pyelitis began with symptoms of cystitis, frequency, burning and hematuria. Two or 3 days later, there was pain in the kidney region with elevation of temperature. The treatment consisted in **rest in bed, free catharsis, restriction of the diet, the forcing of fluids, alkalinization of the urine, and daily lavage of the bladder** with a 1:1000 solution of **mercurochrome**.

Of the 27 *chronic* cases, the pyelograms were normal in 8, slightly abnormal in 9 and definitely abnormal in 6. In these cases, the treatment consisted in hygienic measures, the use of urinary antiseptics such as **methenamine, methylene blue, and caprokol**, the use of a **bacteriophage** and **vaccines** (useless), and **lavage of the pelvis of the kidney** with 1 per cent **silver nitrate**. The only effective procedure was the pelvic lavage.

*Pyelitis follicularis* is reported by J M Hundley, Jr and W J Carson (J Urol 21 341 (Mar) 1929) as being a lymphoid hyperplasia of the lymphoid follicles which, according to most authorities, are a normal constituent of the urinary tract. The lymphoid hyperplasia is generally believed to be a response to the action of toxic irritants. Some observers believe that it is a manifestation of an atypical tuberculosis. The chief symptoms were pain in the kidney and bladder region, frequency, dysuria,

and attacks of painless hematuria. Cystoscopic examination showed a mild inflammation of the bladder. On catheterization of the ureters no obstruction was met. Intravenous phthalein tests showed a very low unilateral output. Pyelograms suggested unilateral kidney disease. It was thought that the findings pointed to unilateral tuberculosis, although no tubercle bacilli were found in the kidney urine.

**PATHOLOGY.**—The kidneys showed evidence of chronic infection of long duration. On section, the pelvis, calyces, and upper end of the ureter were found studded with small grayish-white translucent nodules which projected above the surface. The nodules were similar in appearance to miliary tubercles. Microscopic examination of the kidney revealed moderate scarring with localized and diffuse small round-cell infiltrations. The pelvis showed moderate swelling with erosion of transitional epithelium of the mucosa and an increase in the fibrosis and vascularity of the tunica propria. There was a great increase of lymphoid cells which were uniform in shape and staining, and were accumulated for the most part in the tunica propria and adjacent fibrous tissues. There were many localized circumscribed nodules made up of these lymphocytes which were similar to intestinal lymphoid follicles. Repeated and prolonged search revealed no evidence of tuberculosis.

**TREATMENT.**—*Pyelitis follicularis*, according to Hundley and Carson (*ibid*) cause painless hematuria, and is treated by **ureteral dilatations, kidney lavage and removal of focal infection**. **Nephrectomy or nephrotomy**

is only done when the hematuria does not cease, or is so severe as to endanger life

Because of the participation of the renal parenchyma in nearly all cases of pyelitis, J Hofbauer (*Arch f Gynak* 134 205 (July) 1928) excludes the employment of any anti-septic for internal or intravenous use in acute stages of the disease. A regulation of the diet with careful omission of all albuminous food and the administration of vegetables, abundant grape sugar or milk sugar in warm drinks should be instituted immediately at the beginning of the affection. Pituitary extract is particularly useful in combating inflammation in the urinary tract, upon which it exerts a specific antiphlogistic effect. The ureter is excited to lively peristaltic movement whereby the infected urine is quickly and thoroughly evacuated.

The treatment should always begin with anti-cystitis treatment, states E Pflaumer (*Munch med Wchnschr* 75 1235 (July 20) 1928). Rest in bed, application of heat, bland diet, plenty of water, urinary antiseptics and bladder irrigation. If this does not produce perceptible improvement within a few days, diagnostic and therapeutic use of ureter catheterization should be employed. One should beware of insufficient diagnosis and hasty renal pelvis irrigation.

**PYELITIS IN CHILDREN.**—Fever and the presence of moderate or large amounts of pus in the urine of infants or young children usually leads to the diagnosis of pyelitis. Based on these criteria, pyelitis is a common disease, but the frequency with which it is diagnosed clinically,

is in striking contrast to its extreme rarity at necropsy examination. Such experiences have led a number of observers to doubt the dependence of pyuria in the young on inflammation of the pelvis of the kidney, but they suggest that its origin is in some other part of the urinary tract (J R Wilson and O M Schloss *Am J Dis Child* 38 227 (Aug) 1929).

**PATHOLOGY**—According to B Chown (*Arch Dis Childhood* 2 97 (Apr) 1927) pyelitis, as a sole lesion, seldom, if ever, occurs. This author stated that the common lesion causing pyuria in infancy is a suppurating interstitial nephritis with which is occasionally associated some degree of pyelitis, and rarely, cystitis. The infecting micro-organisms, having gained a foothold in the interstitial tissue by one means or another, produce an acute inflammatory lesion, characterized by edema, an outpouring of polymorphonuclear, and to a less extent, mononuclear cells. Associated with this there are varying degrees of degeneration of the neighboring parenchymatous tissues and necrosis. The micro-organisms and inflammatory products escape into the tubules from which they drain into the pelvis and so appear in the urine. It would seem that in the mild cases, the kidney drains and goes on to complete healing, while in the more severe cases, there are more numerous lesions which are accompanied by insufficient drainage. In the chronic cases, repeated infections of the kidneys occur.

J R Wilson and O M Schloss (*loc cit*) studied necropsy material from 49 infants and young children whose urine during life contained pus. In no instance, did the necropsy

observations justify the diagnosis of pyelitis. The epithelial surface of the kidney pelvis was inflamed in only 2 instances, and in one of these inflammation was of limited extent and degree. In contrast to the absence of pyelitis, in most of the cases, definite focal inflammatory lesions were found in the interstitial tissue of the kidneys. The authors conclude that the most common cause of severe acute pyuria in infants, especially in the type of case usually designated as pyelitis, is an acute inflammatory process of the interstitial tissue of the kidney.

The *channels of invasion* of the kidney pelvis are still open to question. The available facts can readily be used to prove the mode of infection to be either ascending or hematogenous, depending on the inclination of the author. Undoubtedly, there are hematogenous infections of the kidney with the *staphylococcus* and the *streptococcus* which produce discrete abscesses in the cortex of the kidney, with secondary pyelitis. Whether the *colon bacillus* ever produces such abscesses has not been definitely determined. In the newborn, pyuria occurs just as commonly, and even more often in boys than in girls. It is well known that the *colon bacillus* gains entrance to the circulation by way of the gastro-intestinal tract much more readily in the first few days of life than later. It is therefore possible that in these early infections such bacilli reached the kidney by way of the blood stream (H. F. Helmholz, *Am J Dis Child* 38: 968 (Nov.) 1929).

E. Gorter and G. O. E. Lignac (*Arch Dis Childhood* 3: 232 (Oct.) 1928) reported 3 cases of pyelitis with

*jaundice*. From the necropsy study of 1 of the cases, it could not be determined whether the patient first had a *bacillus coli* septicemia with particular localization in the pelvis of the kidney and in the liver and spleen, or whether the pyelitis or pyelonephritis first arose from infection by way of the blood-vessels with subsequent *coli* infection in the liver and spleen.

In view of the fact that pyelitis is most commonly found during the diaper period, and at that time occurs more frequently in girls than in boys, the ascending mode of infection is still considered an important channel of invasion. It seems very doubtful, according to Chown (*loc cit*) that infection can ascend through the urethra in the male infant. In the absence of positive proof, it is reasonable to believe that the route of infection is by way of the blood stream in boys, and that it takes place through the same channel in an equal number of girls. However, since pyelitis occurs more frequently in girls than in boys, the author concluded that the difference in sex incidence may be attributed to the ascending mode of infection in female children.

It has been found that infection of the kidney by the *colon bacillus*, secondary to some stasis in the urinary tract, is common, although it is still disputed whether the *colon bacillus* passes to the kidney by way of the blood stream, by ascension of the urinary passages, or through the lymphatics (Helmholz, *loc cit*). Wilson and Schloss (*loc cit*) stated that while pyuria in infants is usually due to suppurative interstitial nephritis, there are a number of

other relatively rare conditions to which it may be attributed, such as congenital anomalies of the urinary tract, renal calculi, and the like. According to H. Heppler (Am J Dis Child 35 946 (May) 1928) from 1.5 to 2 per cent of all children have some anomaly of the urinary tract. These constitute the persistent cases of pyelitis in which the condition will clear up only by cystoscopic treatment. H. F. Helmholz (Tran Am Pediat Soc 38 25, 1926) found that neuromuscular dysfunction of the bladder may also be a cause of chronic pyelitis in children. Of a group of 15 children admitted to the Mayo clinic with such a condition of the bladder, all but 1 patient had had attacks of fever and pyuria. From experimental observations on rabbits, H. F. Helmholz (Am J Dis Child 38 968 (Nov) 1929) concluded that in so far as his study of spontaneous urinary infection is applicable to conditions in human beings, infection of the urinary tract in infants takes place by the ascending route.

**SYMPTOMS** — The parenchyma of the kidney is involved at some time in most cases of *chronic recurrent* pyelitis, according to H. Rosenbusch (Jahrb f Kinderh 125 127 (Oct) 1929) who examined 16 children with this condition. In most cases, the renal changes do not become chronic. They may be accompanied by increased non-protein nitrogen, by increased blood-pressure and by phenomena revealed by the renal function tests and by the urologic methods of investigation, occasionally an involvement of the kidneys is revealed by purely clinical signs, as cylindruria and edema. Careful examination reveals an in-

creased blood-pressure much more frequently than is indicated in the literature. When the symptoms of renal disease appear early in pyelitis, they indicate a descending infection, when they appear late, an ascending infection is indicated.

**DIAGNOSIS** — Pyelitis in infants and young children is frequently overlooked, according to I. Cole (J Indiana M A 22 437 (Oct) 1929), because of the indifference to the necessity of a routine examination of the urine in all acutely sick infants, the difficulty often experienced in securing urine specimens in infancy, and the absence of any sign or symptom pointing to the urinary tract as the source of the trouble.

**Urinary Leukocyte Count** — L. S. Friedman and A. G. Mitchell (Am J Dis Child 35 201 (Feb) 1928) determined urine of children to be normal or pathologic, according to the cell content per cubic millimeter. The thoroughly mixed, fresh, undiluted urine was examined, and the number of cells per cubic millimeter was determined by means of a blood-counting chamber. The authors found that the urine of apparently healthy infants and children contained an average of 10 pus cells per c mm. The upper limit of normality for all ages, was 40, counts of from 20 to 40 being present more often in girls of the older age groups. Between the ages of 2 and 13 years, the urinary leukocyte count averaged 13 per c mm for girls and 7 for boys, under 2 years of age, the counts were approximately equal for both sexes. Urines which contain more than 20 but less than 40 cells per c mm are suggestive of urinary infection but may readily occur in concentrated

urine and in acute febrile diseases. Leukocyte counts of over 40 per cmm point strongly to infection somewhere along the urinary tract, if vaginitis has been excluded. The value of this method lies in the fact that it at once conveys an accurate idea of the actual number of pus cells in a given specimen. Furthermore, it enables several examiners to compare counts at various times, from the same patient. Finally, it furnishes a prognostic as well as a diagnostic aid, by establishing an increase or decrease in the count. This method of leukocyte determination of the urine does not, of course, take into consideration the factors of total volume and concentration of the urine.

**TREATMENT**—In the treatment of changes in the parenchyma of the kidneys in pyelitis, Rosenbusch (*loc cit*) recommends irrigations of the kidneys by means of the administration of sugar solution (Aron). He states that his results with this form of treatment in nephritis have been so good that he now prescribes sugar solution in pyelitis.

**PYEMIA.**—H. Dintenfass (Laryngoscope 39 731 (Nov) 1929) reports the interesting case of a man aged 61 years who, 1 week following the development of influenza, developed an otitis media which resulted in a spontaneous rupture of the tympanum within 48 hours. This was followed by tenderness over the mastoid with a septic temperature. A mastoidectomy was performed and a *Streptococcus hemolyticus* was recovered. A few days later, the author reports that a blood culture was positive for the same organism. The question of a jugular sinus thrombosis as the

cause of the pyemia was next to be considered. A Queckenstedt test assured him that a partial thrombosis existed but an attempt was made to follow a conservative line of treatment. Pregl's iodine, 20 cc (5 drams), was given intravenously daily and a distinct improvement followed. While on the road to recovery the patient suddenly developed a sharp pain in one elbow and this was followed by a focus of infection, necessitating incision and drainage. The same organism was found. Immediately the blood stream became sterile after 5 previous positive reports were made. Except for limitation of motion in the elbow, the patient made an uneventful recovery.

W. L. Denney (Canad M A J 17 1198 (Oct) 1927) reports 2 cases of staphylococcic septico-pyemia in very young children. One was superimposed on tuberculosis the other on syphilis. With the exception of a mastoiditis in 1 case, neither developed a migrating osteomyelitis or any cardiac or renal lesions.

L. H. Werden (Canad M A J 20 40 (Jan) 1929) reports a case of fatal pyemia following an infection of the finger. Following a minor injury to this member it refused to heal and an infection developed which required incision. This was followed by an uneventful recovery, until the temperature took a sudden upward swing and a leukocytosis of 27,000 developed. A new swelling appeared on the arm and the thigh which required incision. Two blood cultures were reported sterile and later the patient developed a dry pleurisy. Abdominal symptoms supervened and a laparotomy was performed. A fresh adhesion was found causing obstruction at the ileo-

cecal valve This was freed, but the patient did not rally and died

Innumerable preparations, measures and procedures have been used at all times in attempts to increase the bodily resistance and immunity to the influx of organisms to the blood stream **Non-specific protein therapy** has many followers and adherents One case is recalled of a young man approximately 18 years of age who had a staphylococcic infection of the right thumb This was incised and drained and followed by a small metastatic area in the lower end of the left ulna, then a right-sided empyema, and finally an osteomyelitis of the left femur This patient received nothing but supportive treatment and 3 injections of **typhoid vaccine** The blood cultures were repeatedly positive for the *Staphylococcus aureus* and the patient made a successful recovery

**PYURIA.—ETIOLOGY**—Congenital changes in the urinary organs causing pyuria have been reported by H O Mertz (J Urol 19 371 (Apr 1 1928) Twenty cases of chronic pyuria in infancy and early childhood were noted, and congenital obstruction of the urethra was found in 6 cases Bladder changes without urethral obstruction and of a nature to influence a urinary infection were found in 2 cases

Congenital malformations were relatively common in the infant and young child The majority of such anomalies result in urinary stasis, which favors the development of infection In every case a complete urological examination should be made

A urethral stump (non-tuberculous)

as a source of pyuria has been reported by J S Read (J Urol 21 103 (Jan ) 1929)

Obstruction of the urinary tract, F Hinman (Arch Surg 18 21 (Jan-pt 1) 1929) states, is usually the primary cause of the chronicity of pyuria in children He presents the surgical method of attack in the treatment of obstructive hydro-ureteral angularity

The extra-urinary origin of pyuria is classified by R Molla (Siglo méd 83 64 (Jan 5) 1929) as follows (1) The *peritoneal*, may be due to abscess and tuberculosis of the peritoneum, (2) *appendicular*, may be due to chronic appendicitis or to adhesions around the appendix, (3) *osseous* is usually due to pathological processes in the vertebral column, (4) *adnexial*, may be due to tubercular processes, (5) *hepatic* is usually brought on by toxic conditions, (6) *genital*, is usually the result of pathology in the prostate, (7) *diverticular*, is most often caused by septic infection of the diverticulum

Pyuria during infancy is not so much a disease as it is a symptom M Boddin (Med Klinik 25 384 (Mar 8) 1929) states that it is due to various disturbances in the urinary tract A case is reported whose urine did not show the hemorrhagic inflammatory character of the disease revealed at post-mortem examination

**DIAGNOSIS**—Cystography is a safe and instructive procedure in diagnosing *chronic* pyuria C F McKhann (Am J Dis Child (Aug ) 1928) is of the opinion that cystoscopy should be done only after a relatively long period of observation and treatment, including a careful

physical examination of the patient, chemical, microscopical and bacteriological examination of catheterized specimens of urine, the determination of the residual urine, examination of the excretion of phenolsulphonephthalein and of the non-protein nitrogen of the blood, x-rays of the abdomen, and a cystogram

Counting the number of pus cells in a specimen of fresh urine is suggested by C Dukes (Proc Roy Soc. Med (Sect Path) 21 13 (May) 1928) as an accurate method of determining the amount of pus present. The urine is not centrifuged, and a counting chamber such as is used for cell counts of the spinal fluid is employed. He considers pyuria *intermittent* when the pus is not present every day and *continued* when the pus is constantly present.

**TREATMENT**—In the treatment of pyuria, due to colon bacillus, A H Johansen (Arch Int Med 44 303 (Sept) 1929) has had 75 per cent cures in 24 patients treated. He employs 0.6 Gm (10 grains) of **calcium chloride** with a coating of about 0.3 Gm (5 grains) of **phenyl salicylate**, using 3 tablets, 3 times a day, as the standard dose.

As bacterial medicaments, H von Mettenheim (Med Welt 3 450 (Mar 30) 1929) advises the administration of **phenyl salicylate** and of **methenamine** from 5 to 6 times daily. He asserts that the alternation of these remedies every 3 or 5 days will increase their effectiveness. **Alkali therapy** with **sodium citrate** or **sodium bicarbonate** is effective in changing the acidity of the urine. The external genitalia should be washed regularly. Injections with a 0.25 per cent to 1 per cent solution of **silver nitrate** are

also effective, they should always be followed by irrigation with a solution of **sodium chloride**. These treatments may be given at intervals of from 3 to 4 days.

The **dietetic** treatment of pyuria in children is most important, according to H Aron and H Hirsch (Monatschr f Kinderh 43 385 (June) 1929). During the past 5 years they used neither urinary antiseptics given by mouth nor irrigations, in the treatment of pyuria in children, but, instead, have relied solely on dietetic treatment. They gave an amount of **carbohydrate** fulfilling as completely as possible the caloric requirement. The carbohydrate is administered in the form of ordinary **brown sugar** in older children, in the form of a mixture of brown sugar and **dextrose** in younger children, and in the form of a solution of dextrose in nurslings. Nurslings are given from 20 to 25 Gm (5 to 6¼ drams) of dextrose for each kilogram (2¼ pounds) of body weight, in older children the amount is decreased to 15 or even 10 Gm (3¾ or 2½ drams). Not more than 250 Gm (8½ ounces) of sugar a day is given. At least 1 liter (quart) of fluid should be given, in older children the amount varies from 1.25 to 1.5 liters (quarts). If the solution of sugar cannot be given by mouth, it is given in the form of retention enemas. The writers no longer hesitate to keep infants and children of all ages on this exclusive sugar diet for 2 or 3 days. They state that in not 1 of 39 cases of pyuria treated in this manner was glycosuria noted, and in all of them the results obtained were better than the results obtained formerly with the treatment with urinary disinfectants.

## Q

**QUACKERY.**—Quackery consists in proclaiming loudly, insistently, and continuously to the general public what the physician frequently finds necessary to say to the individual patient for his comfort and peace, *i. e.*, that he can be relieved or cured. Aside from the unworthy advertising, the most potent argument against the matter is the fact that those who resort to the methods are usually ignorant individuals incapable of giving the best available treatment to the trusting sick and hence can not be too ardently combatted. The fight against quackery is not so much a fight against any special sect or method of treatment as it is against the inadequate education of those who choose to practice a particular method, and their claims as cure-alls which are manifestly absurd. Fortunately, there is progressive recognition of this and denial of false and misleading advertisements to practitioners and nostrums alike by reputable medical organizations. Unfortunately, however, this is not uniform, for there are still found newspapers and periodicals, lay and medical, which carry advertising matter of inadequately trained men and of innocuous, if not harmful, medicaments. Due to the activity of the American Medical Association and its Council on Pharmacy and Chemistry, the more blatant quacks are being uncovered, unfortunately, however, not to the general public. Misbranded nostrums also are being pilloried and through government assistance gradually being removed from drug and grocery shelf. The details of the protective work which is being carried

on so effectively are to be found in the pages of the Journal of the American Medical Association. The United States probably stands at the head of the list in this work.

**QUININE — PHYSIOLOGICAL**

**ACTION.**—R. N. Chopra, J. C. David and B. B. Dikshit (Indian J. M. Research 15: 571 (Jan.) 1928) made experiments showing that the oxytocic action of quinine is quite pronounced when the uterus is nearly full term, but in early pregnancy no untoward effect is likely to be produced. No experimental evidence has been obtained to show that quinidine is more effective as an oxytocic than quinine or that it is 10 times stronger in its stimulating action on the uterus than quinine.

G. Singer (Wien klin. Wchnschr. 40: 1261 (Oct. 6) 1927) reports on the effect of quinine in 72 cases of severe and inveterate constipation, as seen roentgenographically before and after administration. Three preparations of quinine were tried: quinine dihydrochloride, quinine dihydrochloride carbonate and quinine dihydrobromide. These were given intravenously, subcutaneously and rectally, as suppositories or as small enemas. The latter methods gave the best and most rapid results.

Of a series of 30 patients treated with dihydrochloride suppositories, 28 reacted and 2 did not react to 0.25 Gm. (4 grains) per suppository. As a rule, action was obtained in a few minutes, the longest period being within 2 hours. The small enemas consisted of 25 c.c. (6¾ drams) of a 2 per cent solution of the drug, and no unfavorable results were observed even with 1 Gm. (15 grains). The other preparations were used rectally, intravenously, subcutaneously or intramuscularly in doses of 10 c.c. (2½ drams) of a 5 per cent solution. Positive results were obtained in 54 of the entire series of 72 cases.

The author concludes that quinine, especially in soluble double salts, produces an immediate stimulation of the smooth musculature of the intestine which seems



to be similar to its action on the bladder and on the uterus. He also suggests that the quinine treatment might be found of use in the post-operative paralysis of the intestines.

D I Macht (*J Pharmacol and Exper Therap* 34 137 (Oct) 1928) gives evidence that quinine can be absorbed from the vaginal tract of experimental animals when instilled in aqueous solution. He emphasizes the dangers of local applications of drugs to mucous membranes, and the poisoning which may result when drugs are absorbed into the general circulation.

**UNTOWARD EFFECTS**—J M Devillaverda (*Med Ibera* 1 173 (Feb 18) 1928) records the case of a man, aged 33, who developed right musculospiral paralysis in the outer aspect of the upper arm 5 to 6 cm above the elbow directly after subcutaneous injection of a solution of quinine for malaria. Three hypotheses may be suggested to explain the paralysis: (1) the neuritis was due to an infection, (2) it was caused by a direct lesion of the nerve by the point of the needle, (3) it was due to direct irritation of the nerve by the quinine. Proliferation of the connective tissue around the nerve must, however, be taken into account, since compression of the nerve may result. Because of the immediate loss of power, following the injection, the most likely explanation is that the lesion of the musculospiral nerve

was produced by direct action of the drug on the fibers of the nerve.

J Rollet (*J de med de Lyon* 10 209 (Mar 20) 1929) reports a case of blindness in a woman aged 35, after the ingestion of 10 Gm (2½ drams) of quinine sulphate and makes a study of the ocular disturbances in quinine intoxication. The condition may be observed at any age and in both sexes after the ingestion of from 0.005 Gm (1½ grain) to as much as 30 Gm (1 ounce) of quinine. The gravity of the symptoms depends more on the personal susceptibility of the patient than on the dose of the quinine. In typical cases after the usual symptoms of quinine intoxication (cephalgia, vertigo, tinnitus aurium, some degree of deafness, drowsiness, vomiting and sometimes diarrhea) complete blindness appears rapidly, but usually central vision is recovered very soon. The visual field, however, remains contracted. Mydriasis is present, the optic disk is pale and the retinal arteries are constricted. All the symptoms may disappear within several minutes or in several hours, but they may also persist indefinitely, and even the blindness may become permanent. The condition is caused by the action of the quinine on both the retinal nerve cells and the retinal arteries (spasm). The treatment, besides rest and tonic medication, consists of the administration of vasodilating remedies especially atropine.

## R

**RABIES**—In line with the recent advances in preventive medicine generally, the literature on rabies during the last few years has largely concerned itself with vaccination and prophylaxis.

**INCUBATION**—The variation in incubation period with the part affected, the biting animal, and the age of the patient is well known. Dawydowski (*Zentralbl f Allg Path*, 1928) speaks of the incubation period as averaging 15 days for cat scratches, 22 days for bites by wolves, and 30 or

40 days for dog bites. He also emphasizes the direct relationship between the period of incubation and the clinical course, reporting an average duration of disease of 3 days when the incubation period was less than 30. In bites on the leg the incubation period may be as long as 10 weeks.

**ETIOLOGY**—The causative organism has not yet been found. R Grilichess (*Schweiz med Wchnschr* 59 729 (July 13) 1929) reported many Gram-negative bacilli in the

pus from a discharging dog bite wound, but he finds no evidence that this might be responsible for rabies

**PATHOLOGY** — The cerebral lesions of hydrophobia tend to localize in the midbrain, particularly in the *substantia nigra*. These lesions, according to K. Lowenberg (Arch Neurol and Psychiat 19 638 (Apr) 1928), are both degenerative and inflammatory. In the cortex and basal ganglia degenerative areas were found. The tendency to localize in the midbrain and corpus striatum recalls the similar distribution of the lesion in encephalitis. In a contribution to the dynamic pathology of rabies, W. H. Gant and A. W. Ponomarew (Ztschr f d ges exper Med 66 582 (Aug) 1929) demonstrate by animal experimentation, that the virus travels along nerve trunks, and believes that its course is largely, if not exclusively, along the axis cylinders. Extracerebral pathology was reported by Pivatori (Ann d'ig 38 1 (Jan) 1928), who found hemorrhage in the gastrointestinal tract.

**SYMPTOMS** — There have been no recent additions to the knowledge of the symptomatology of hydrophobia, although Y. Y. Gordon reported (Sovrem psikhoneurol vol vi, 1928) a case of Landry's ascending paralysis which was demonstrated by animal inoculation and post-mortem study to be due to rabies.

**TREATMENT** — There has been no recent modification in the standard Pasteur treatment of rabies, but at the International Rabies Conference, in Paris, in 1927, attention was focused on the occasional *paralytic complications* of this treatment. The incidence is about 3 cases in 11,000 treatments, the victims being almost always

adults. The incubation period of this complication is 2 or 3 weeks (shorter than rabies, therefore), and it occurs more often with attenuated cords than in the less desiccated ones. It also is commoner when living vaccine is employed than when the dead preparation is used. P. Remlinger, discussing this (Ann de l'Inst Pasteur 42 71 (Mar) 1928), confesses ignorance as to the exact mechanism, but feels sure that it is not an anaphylactic reaction, that it is not due to contaminants, and that it is not a modified rabies. The paralyzes may be acute and ascending (Landry's type), or may be represented by a level lesion, or by a peripheral neuritis. In the latter event, a facial palsy is the commonest form. The pathology of this condition is questionable. Babes (Compt rend Soc de biol, 964, 1928) reported softening, largely in the white matter, without finding Negri bodies. In the rare cases when acute paralysis develops in the course of anti-rabic therapy, it is necessary to discontinue the treatment.

**PROPHYLAXIS** — With proper dog control, rabies should disappear entirely. In Haiti, according to G. C. Thomas (U. S. Nav. M. Bull. 26 315 (Apr) 1928), no dog can be licensed unless it has received an anti-rabic inoculation. The Haitian public, however, unaware of the importance of this law, generally disregard it, with the result that hydrophobia is a frequent disease on this island. Such indifference is not limited to Haiti. In the United States there is no rational control of the health of dogs, and the menace of rabies still exists. C. A. Shore (South M. J. 21 397 (May) 1928) strongly condemns the general laxity of the public attitude

on this question, calling attention to the fact that quarantine on dogs has made Australia a rabies-free continent, and strict law enforcement in regard to muzzling of dogs, has given England 6 years of freedom from this disease. Apart from control of dogs, the prophylaxis against hydrophobia includes the prompt cauterization of the wounds (fuming nitric acid should be used) and, if indicated, a course of vaccinations. The Semple preparation, highly praised by M J Rosenau (New England J Med 198 787 (May 31) 1928), is a fixed virus killed with phenol and injected daily for 2 weeks. Another vaccine, suggested by C Stuart and K S Krikorian (J Hyg 29 1 (Apr) 1929) is a 2 per cent emulsion of fixed virus brain, killed by heat and phenol, and diluted with saline prior to use. These writers report only 5 cases of paralysis out of almost 100,000 cases treated by this method. They favor the use of small doses over a number of days, rather than the less frequent employment of larger doses.

With the awakening of public conscience on this subject, and with the development of modern bacteriological approaches to anti-rabic immunization, the hope may be entertained of eventually eliminating the dread of hydrophobia.

**RADIUM.** See X-RAY AND RADIUM THERAPY

**RAYNAUD'S DISEASE.—ETIOLOGY**—T I Bennett and E P Poulton (Am J M Sc 176 654 (Nov) 1928) report a case of a man 60 years of age who had suffered from childhood from chilblains and at present was sensitive to exposure

to cold on the hands. He presented the typical picture of Raynaud's disease. Treatment with faradism and intravenous injections of radium emanations was unsuccessful. Morphine was necessary for the pain. The right inferior cervical sympathetic ganglion was removed and an attempt was being made to perform a periarterial sympathectomy on the left radial and ulnar arteries when the patient died.

Autopsy revealed a large carcinoma of the lesser curvature of the stomach near the esophageal opening. The removed cervical ganglion was found to contain carcinomatous cells of gastric origin. Although only 1 other case of the association of the 2 conditions could be found in the literature, the authors believe the cancer cells in the ganglion to be the cause of Raynaud's disease.

Iwai and Nin (Mediz Welt, June 16, 1928) came to the conclusion, following extensive experimentation, that the phenomena of the disease were caused by autohemo-agglutinins, rather than the spasmodic contraction of the vessel wall on the basis of a vasomotor neurosis. They believe that under the influence of cold, the auto-agglutinins agglutinate the erythrocytes and the resultant blood clot stops the circulation in the capillaries.

T Lewis (Heart 15 7 (Aug 3) 1929) studied many cases of a variety of Raynaud's disease affecting the digits in which the process in some cases was so severe as to go on to a slow dry gangrene. The immediate cause of the defective circulation is believed by Lewis to be a spasm of the digital arteries. He believes the reaction to cold in these cases is a direct reaction due to the condition of

the vessel wall and not of vasomotor origin as has been so generally accepted

**PATHOLOGY.**—K Kornblum (Am J Roentgenol. 21:448 (May) 1929) asserts that there are no characteristic bone changes which are pathognomonic of the disease. Identical changes have been found in scleroderma and leprosy

**DIAGNOSIS.**—A case reported by G Lion (Bull. et mém Soc méd d hôp de Paris 51 1451 (Nov 10) 1927) illustrates the difficulty of differential diagnosis. Following a severe attack of bronchopneumonia of pneumococcic origin a series of cyanotic areas with small red spots in the center appeared on the fingers of the left hand, both great toes, the chin, both ears and both cheeks. These small areas became gangrenous and scar formation occurred following their healing. During a second attack of pneumonia, there was no return of the condition although the patient complained of a sensation of cold in the scars of the previous lesions

The condition was differentiated from Raynaud's disease by its sudden onset without premonitory syncope and asphyxia, the rapid development of the gangrene and the subsequent course. Its suddenness suggested purpura but the liver and spleen were not enlarged

**TREATMENT**—C R Brooke (Physical Therap 47 215 (Apr) 1929) believes a complete and thorough physical examination is the first essential, including a mental and neurological study. Existing foci of infection should be removed. Abstinence from alcohol, with a low protein diet, avoidance of highly seasoned foods, undue exposure to cold, and a

change of environment should be recommended. Radiant light and heat are helpful in many cases. A surface high frequency treatment for 15 minutes is frequently beneficial. Scotch douches are a decided aid. Autocondensation acts as a general sedative and ultra-violet rays have their adherents

In the more severe cases diathermy has been of advantage especially when it is followed by high frequency current. In the most severe cases, whenever surgical measures are indicated they should always precede the use of physical measures

Surgically, many types of operation have been devised for ganglionectomy and ramisectomy to relieve the severe symptoms. C F McClintic and W J Seymour (J Michigan M S 28 43 (Jan) 1929) describe in detail a bilateral sympathetic ganglionectomy which resulted in stoppage of the heart because of stimulation of the vagal fibers while the accelerator fibers had been severed at a previous operation on the opposite side. It was decided to perform a ramisectomy and the patient recovered

A W Adson and G E Brown (Surg Gynec Obst 48 577 (May) 1929) report 2 cases of intrathoracic sympathetic ganglionectomy by the dorsal approach. They believe the results of surgical control in this disease are an accomplished fact

C Imperiale (Riforma med 44 242 (Mar 5) 1928) reports a case of symmetrical gangrene of the lower extremities in which bilateral amputation was necessary, but the recovery was uneventful

**RECTUM.—CANCER**—F Mandl and W Pacher (Wien med Wchnschr.

79 991 (July 27) 1929) reviewed 374 cases of cancer between the years 1920 to 1928. Hereditary factors were detected in 47 instances and 178 occurred in men. The majority occurred between 50 and 70 years of age. Colostomy was performed in 93 cases because a radical operation was not possible. Only 6 of these patients lived from 2 to 4 years after the operation. The average duration of life following colostomy was 14 months. The radical sacral operation by Hoche-neggs' method was performed on 127 patients. The mortality in these operations was 11 per cent. Of these patients, 31.5 per cent lived longer than 3 years and 27.2 per cent were still freed from relapse 5 years after the operation.

**PATHOLOGY**—In discussing pre-cancerous changes in the rectum, J. P. Lockhart-Mummery and C. Dukes (Surg Gynec Obst 46:591 (May 28) 1928) emphasize that the earliest recognizable lesion of the development of cancer in the rectum is a hyperplastic change taking the form of irregular epithelial proliferations, scattered over an extensive area of the bowel. This is followed by the appearance of possible tumors—adenomas, which are usually numerous and often separated from each other by several inches of mucous membrane, normal in appearance to the naked eye. The authors have called this the precancerous stage. It will appear that carcinoma formation is an accident happening to the preceding adenoma. With the development and dissemination of the malignant tumor, the neighboring epithelial proliferations and benign tumors tend to retrogress and disappear so that they are less evident in association with

large malignant ulcers. These opinions are supported by pathological and clinical observations.

**SYMPTOMS**—D. F. Jones (J Missouri Med A 24:179 (May) 1927) believes that the only early symptoms of carcinoma of the rectum are bleeding from the rectum and a change in the patient's bowel habit. The author believes that x-ray should not be used until after digital and proctoscopic examinations have been made.

According to C. C. Mechling (Atlantic M J 31:232 (Jan) 1928), rectal cancers constitute about 4 per cent of all cancers. He advises a thorough rectal examination in all cases when a patient who has always been regular in his bowel habit seeks relief from an unusual and obstinate constipation. Diarrhea develops from 3 to 6 weeks after the period of constipation. W. H. Kiger (California and West Med, 31:313 (Nov 29) 1929) also advises a thorough examination in all rectal cases, regardless of age, when there is increasing constipation or change in the bowel habits or the occurrence of blood in the stool.

J. H. Allen (Atlantic M J 31:235 (Jan) 1928) found that early symptoms included indigestion with nausea, abdominal discomfort when certain positions were assumed, rectal discomfort, the passage of flatus with or without mucus and the sensation, after defecation, that the bowel movement has not been completed. A persistent diarrhea which does not yield to bacillary or amebic treatment is strongly indicative of malignancy.

In 25 consecutive cases of cancer of the colon and rectum analyzed by A. F. Hurst, T. W. Turner and J. F. Venables (Lancet 1:1275 (June 23)

1928), symptoms had been present from 2 to 36 months when the patients were first seen. The 2 earlier symptoms are abdominal discomfort or pain and a change in the habitual action of the bowels. The discomfort was referred to the segment of bowel proximal to the obstruction. Pain produced in the distal part of the pelvic colon or pelvi-rectal flexure is referred to the mid-line between the umbilicus and the pubes. The pain is often colicky and its disappearance may coincide with a gurgle which can be heard and felt. In 9 of 25 cases, the patient had become more constipated and in 6 had complained of diarrhea, in 8 cases there was alternately constipation and diarrhea or an initial attack of diarrhea followed by persistent constipation. In only 2 cases had no change in the habitual action of the bowels been observed.

Cancer is believed by O. Kraus (Med Klin 25 466 (Mar 22) 1929) to be more frequent in the rectum than in any other part of the gastrointestinal tract. It occurs more often in men than in women. He finds that surgical treatment gives the best permanent results if detected in its early stage. In 3 early cases he observed a swelling of the testis which could not be traced to venereal disease.

**PROLAPSE — TREATMENT —** An analysis is made by G. Lundh (Acta chir Scandinav 64 58 (Oct) 1928) of 84 cases in 14 of which the conservative method of treatment was adopted consisting of **dieting, rest in bed, and rectal lavage**. In 69 cases simple **thermocauterization** was done, but only after conservative methods had proved useless. Re-examination of the 14 cases treated conservatively showed that all of them had had re-

currences, 1 of these was subsequently treated by thermocauterization and improved. The others refused treatment. Of the 69 patients treated by thermocauterization, those of whom information could be obtained (or 61) proved on re-examination to be free from their old disorder, and in 2 cases only did the prolapse remain to a slight degree.

Injections of phenol and hamamelis were used by J. A. C. Macewen (Brit M J 1 633 (Apr 14) 1928) in a case of rectal prolapse in which there was protrusion on straining for 2 inches below the anal margin. He injected 1 c c (166 minims) of **phenol** and **hamamelis** into the prolapsed rectum once a week for 6 weeks and gradually increased the dose to 2 c c (32 minims). Care should be taken to retain the prolapse after injection and Macewen mentions that it is well to give 1 or 2 final injections after the mass no longer comes down.

The Lorin-Epstein method of **alcohol injections** (Archiv f klin Chir 151 728 (Oct 19) 1928) consists in injecting 50 to 60 c c ( $1\frac{2}{3}$  to 2 ounces) of 75 to 80 per cent alcohol in cases of prolapse of the rectum for the purpose of effecting a sclerosis. **Lumbar anesthesia** is advised, although it is possible to inject without an anesthetic if a higher percentage of alcohol (80 to 90) is used. The injections are made between the mucosa and the muscularis, the outer wall of the rectum, through the whole wall of the bowel from within outward, toward the levator and the perirectal region, into the ischio-rectal fossa, especially between the rear wall of the rectum and the sacrum and the coccyx, and into the sphincter, but avoiding the skin. Results are not apparent for

several months as the sclerosing process develops slowly. Lorin-Epstein prefers this method to surgical intervention because it does not disturb anatomic relations nor does it interfere with the innervation.

H Matti (Deutsche Ztschr f Chir 212 236 (Nov 28) 1928) demonstrated experimentally on dogs that a rubber ring encircling the rectum can remain *in situ* up to 25 months without causing any irritation and with maintenance of its elasticity. In 12 cases which he reports he used **sphincteroplasty**, inserting a rubber ring and a cure resulted in from 1 to 3½ months. In a boy 9 years of age, with incontinence of long standing, a good result was obtained. The ring has been imbedded 2 years without producing any unfavorable reaction. These rings are made of pure rubber and sulphur but must not contain any metal. The ring is sufficiently elastic to close the lumen of the rectum and at the same time to be opened by the physiologic peristaltic waves of the bowel. The ring is inserted subcutaneously as a 4 to 5 mm thick tube through 2 small skin incisions united by a tunnel made in the perineal fascia. The ends of the tube are knotted by silk sutures thus converting it into a ring. Its purpose is to increase the natural resistance of the rectum.

J M Lynch (J A M A 89 1050 (Sept 24) 1927) describes an operation for rectal prolapse in which he attempts to restore the involved tissues to their normal position to diminish the slack and to arrange the pelvic floor so that there will be an equal division of pressure. The abdomen is opened by a median incision. The patient is placed in the Trendelenburg position and the small intestines are

walled off by laparotomy pads. The leaves of the mesentery are cut close to the bowel avoiding the vessels and the incision is carried across between the rectum and the uterus in the female and the bladder and the rectum in the male. The peritoneal leaves of the mesentery near the cul-de-sac are dissected back so as to expose the lateral ligaments and the pelvic colon and rectum are pulled out of the pelvis and held while the lateral ligaments are shortened by interrupted sutures. The peritoneum is sutured to the top of the pelvic colon, thus forming a new pelvic peritoneal diaphragm. The cul-de-sac is obliterated and the weight is equally distributed.

**Rectopexy** was used by A Ghedini (Arch ital di chir 18 327 (1927)). The procedure consists of suspension of the rectum (rectopexy), rectoplication (Peter's), obliteration (Von Moskowitz) of the peritoneal cul-de-sac of Douglass, and restoration of the normal condition of the perineum and anus as far as possible by perineo-anorrhaphy.

**RESPIRATION, EFFICIENCY OF THE MECHANICAL FACTORS.—RESPIRATORY RESERVE**—From his previous experiments Willis S Lemon (Am J M Sc 177 319 (Mar) 1929) concluded that either unilateral or bilateral phrenic neurectomy was attended with slight risk and did not produce demonstrable impairment of function in general, or of respiratory function in particular. Study of comparative anatomy lends color to the belief that the primary function of the diaphragm is to make possible an increase in intracolonic pressure and that its respiratory func-

tion is secondary to this primary purpose

The intercostal muscles have been accepted as important muscles in respiration and are easily studied

The author describes the effect on respiration of loss of variable numbers of intercostal muscles, the effect of loss of all the intercostal muscles, of paralysis of the intercostal muscles combined with phrenic neurectomy and also the effect of the different operations on the movements of the wall of the chest, on intrapleural tension and all the animal's ability to maintain efficient vital capacity. Only 4 animals were used in this experiment, because of the difficulties in training them for observation with a spirometer

**RESULTS**—Group I *Effect of Sectioning from 6 to 12 Intercostal Nerves*—On the day following operation, the animals were lively and did not show evidence of cyanosis or of respiratory embarrassment. On succeeding days with a certain number of dogs the variation of the latitude of movement of the wall of the chest from normal became increasingly less until a difference in the excursion of the 2 sides could not be observed, nor could a difference in amplitude of the outward movement of the costal arches be observed or discovered by actual measurement. The intrapleural tensions were equal bilaterally and with normal limits

Among the dogs in which all the intercostal nerves had been severed on 1 side, the restoration of movement was neither complete nor frequent

In all the animals studied, regardless of the number of intercostal nerves sectioned, the respiratory and

pulse rates remained normal, the vital capacity was so little disturbed that dyspnea and cyanosis did not occur in a single instance. The animals played about and could not be distinguished from their normal mates

Group II *The Effect of Sectioning All Intercostal Nerves*—With both sides paralyzed, the respiratory movements were symmetrical. Observations, measurement and kymographic readings, all demonstrated the curious phenomenon of outward movement of the paralyzed chest during inspiration. The fluoroscope demonstrated that the movement of the diaphragm remained undisturbed

Group III *Effect of Sectioning Intercostal and Phrenic Nerves*—Animals, in which from 10 to 12 intercostal nerves had been cut on 1 side, and the phrenic nerves severed on the same side, played normally, respiratory and pulse rates were normal. There was evidence of diminished outward excursion of the chest wall during inspiration

When all the intercostal nerves were sectioned the dog did not give any evidence of dyspnea, pulse and respiratory rates remained normal. The diaphragm moved normally, the costal arches moved outward with each inspiration. When all the intercostal nerves and 1 phrenic nerve were sectioned, the dog was still able to run up and down stairs without dyspnea. The amplitude of movement on the 2 sides, as determined by actual measurement, was bilaterally equal. After sectioning of the main phrenic nerve the dog was forced to employ every available muscle about the head, neck and shoulders to expand the chest

Group IV *Effect of Transection of*



*the Spinal Cord*—Transection, at or above the level of the fourth cervical vertebra, produced almost immediate death. At this level the diaphragm and intercostal abdominal and shoulder-girdle muscles were functionless, and the remaining muscles did not retain sufficient function to maintain respiration.

If the cord was severed at the level of the seventh cervical vertebra the wall of the chest became almost motionless.

The pulse and the respiratory rates were normal and there was no evidence of respiratory embarrassment. The upper part of the chest along the line of attachment of the ribs and the costal cartilages developed a paradoxical direction of excursion during inspiration. This portion moved toward the midline on inspiration and fell outward during expiration. The abdominal movements showed much less alteration.

*Intrapleural Tension*—The operative procedures did not cause any observable departure from normal or any observable difference in the 2 sides, as far as intrapleural tension is concerned.

**RESPIRATORY TRACT.—FOREIGN BODIES IN**—In a case reported by Feldman (Klin med 6 683 (June) 1928), a bone was swallowed and remained 3 years and 4 months in the trachea. In the beginning a diagnosis of whooping-cough was made, on account of attacks of coughing. Later on, the patient had sputum colored with blood, difficulty in breathing, and slight fever. The diagnosis of tuberculosis was made. Three years later, bronchoscopy was

performed and the bone was removed. All symptoms disappeared.

According to R. G. Allison and K. Phelps (Radiology 10 157 (Feb) 1928), the clinical features produced by a non-opaque foreign body in the air passages are very striking. The outstanding feature is the violence of the reaction, the peanut, which is the most common, seems also to be the most toxic. The reaction consists of trauma, edema, congestion, exudation, spasm and toxemia. Two years or younger is the age of the patient in 90 per cent of the cases.

The x-ray signs described by Manges, Jackson and others, include (1) Unilateral emphysema on the affected side, (2) flattening and limited mobility of the diaphragm on the affected side, and (3) displacement of the heart and mediastinum toward the unaffected side.

M. Larget and J. P. Lamare (Bull et mém Soc nat de chir 55 26 (Jan 19) 1929) report a case of prolonged migration of a spike of oat grass, 3.5 cm long, inhaled by a child aged 2 years. For several weeks afterward signs of bronchitis were observed. Later on, the spike of oat grass reaching the pulmonary parenchyma, caused a pulmonary abscess, with adhesions to the parietal pleura, and extension to the chest wall, through which it was eliminated.

Martinez (Rev de med y cir de la Habana 33 120 (Feb 10) 1928) reports 6 cases in children, aged from 4 to 12 years. Extraction was performed by means of bronchoscopy. On account of the small size of the larynx at this age, without great skill, tracheotomy is preferable to bronchoscopy.

Muller and Marchand (Paris Med

18:501 (Dec 8) 1928) from a study on the introduction of foreign bodies in the respiratory tracts during experimental submersion, report their results after 5 years of observations on asphyxia, having found that foreign bodies kept in suspension in water penetrate up to the fundus of the alveoli

Discussing *the fate of foreign bodies swallowed by children*, D E S Wis-hart (Canad M A J 18 415 (Apr) 1928) advocates that the following precautions should be observed

1 Do not reach for the foreign body with the finger, lest the foreign body be thereby pushed into the larynx, or the larynx be thus traumatized

2 Do not make any attempt at removal with the patient in any position other than the recumbent, with the head and shoulders lower than the body

3 Do not hold up the patient by the heels, lest the foreign body be dislodged and asphyxiate the patient by becoming jammed in the glottis

4 Do not fail to have a radiograph made, if possible, whether the foreign body in question is of a kind dense to the ray or not

5 Do not fail to search endoscopically for a foreign body in all cases of doubt

6 Do not pass an esophageal bougie, probang, or other instrument blindly

7 Do not tell the patient he has no foreign body, until after radiography, physical examination, indirect examination, and endoscopy have all proved negative

**RESUSCITATION.**—Makarowski (Vrach dielo 11, No 13 from Amer Med 24 628 (Sept) 1929) reminds us that when the heart action fails, for instance in *narcosis*, *asphyxia*, *poisoning*, etc, *percussion*

*of the heart region* frequently gives surprising results The technic is as follows Close the fist tightly, leaving the thumb out alongside of the index finger, then carry out percussion immediately over the heart with great strength and very rapidly in a manner resembling manual vibratory massage

J Nordentoft (Ugesk f Laeger 90 741 (Aug 2) 1928) has given *adrenalin injections into the heart* as a means of resuscitation A case is reported of a man, aged 81, on whom suprapubic cystostomy was performed under lumbar anesthesia Toward the end of the operation he collapsed completely, pulse and respiration ceasing Through a needle inserted in the fourth intercostal space, along the upper border of the fifth rib, and passing obliquely upwards and inwards, 1 cc (16 minims) of a 0.1 per cent solution of adrenalin was injected Within about 2 seconds, very violent heart beats began, the face became flushed instead of gray, and the respiration returned, being natural and deep The patient lived for 14 days, then suddenly collapsed and died Of all the drugs used for this purpose, including camphor, strophanthus and extract of the pituitary body, adrenalin seems to be by far the most effective

E Martin and Costedoa (J de méd de Lyon 8 589 (Nov 20) 1927) agree that in cases of accidental *drowning* or suicide, death can be caused by (1) *syncope*, when the aspect of the person is pallid, or by (2) *asphyxia* due to the penetration of the lungs by water, when the aspect is blue If restorative efforts are started early the pallid type of drowned person can usually be revived without difficulty, but in the second type, the pulmonary lesions are such that in many cases the treatment is without effect In the treatment of the cyanosed individual, *bleeding* and *artificial respiration* in the prone or ventral decubitus should be tried, and both these methods should be used in cases of doubtful diagnosis

**RETINA.—BLOOD-VESSELS—ANOMALIES**—A M Yudkin (Arch Ophth 56.474 (Sept) 1927) describes a case of *bilateral pre-papillary loop* of the retinal artery In both eyes the

central artery of the retina divided on the disc into 2 main branches. From the lower a spiral loop protruded into the vitreous, took a sharp turn, and returned to the upper temporal edge of the disc after making 3 spiral coils. The other vessels were normal. The writer also reports a case in a colored girl 14 years of age and gives a review of the literature on similar conditions. He agrees with Leber and von Hippel that the abnormality is not due to inflammation and is not a relic of the hyaloid artery.

**Disorders**—H. P. Wagener and J. F. Gipner (Am J Ophth 10 650 (Sept) 1927) describe 5 cases of *spasm* of a branch of the retinal artery. In 2 of the cases the affected branch was completely obliterated beyond a certain point and quite invisible. While under observation, the artery opened up, refilled with 3 progressive pulses, and became normal, vision being completely restored. In both patients early signs of hypertension were noted, and in 1 of the cases symptoms of the Raynaud type had been detected.

They also review the history and findings in 2 cases of spasm in a branch of the central retinal artery and compare them with the history and findings in 3 cases of arterial thrombosis. The first condition, they contend, never leads to permanent blindness, its characteristic picture is complete invisibility of the artery distal to the spasm during the spasm and restoration to normal subsequently.

In a discussion of the important rôle played by the perivascular tissue in vascular changes and the ease with which these changes may be recognized in the background of the eye,

N. Pines (Brit J Ophth 13:97, 161, 225, 1929) emphasizes the following points:

1 The white streak in the center of the larger vessels is due to the perivascular connective tissue.

2 Dotting of the light reflex on a vessel wall may be caused by spasm of the muscularis media together with histological changes in the arterial wall.

3 When once formed, vascular changes never disappear.

4. True aneurysm may be seen on the retinal vessels and the danger of rupture is not great.

5 The chief cause of hemorrhage is fragility of the arterial wall (calcification).

6 Syphilis *per se* does not especially attack the retinal vessels.

7 In diabetes the retinal vessels are attacked even when the condition is mild.

H. Barkan (Arch Ophth 57 402 (July) 1928) reports a case of *air embolism* of the retinal vessels in a man 35 years of age who had several attacks of blindness lasting from 12 hours to 6 days following the removal of a piece of bone from a bronchus. Several months later the fundus was found negative, but the fields showed relative and positive scotomata.

Van Lint (Bruxelles-med 8 1509 (Sept 16) 1928) reports the case of a man of 30 with syphilis, for which he underwent a series of neoarsphenamine injections. Edema of the retina, and obliteration of the retinal artery developed in the right eye.

Three cases of *embolism* of a retinal artery are reported by T. H. Butler (Brit J Ophth 11 559 (Nov) 1927). In the first, the condition was peripheral and there was a corresponding

sector field defect Under treatment by paracentesis, massage, and the use of amyl nitrite, the condition cleared up entirely In the second and third cases the emboli were situated more centrally and caused loss of vision with the exception of light perception The cause of the condition in the first case is not stated In the second and third cases it was endocarditis and thrombosis of a varicose vein respectively

F Juler (Brit M J 2 791 (Nov 3) 1928) reports a case of *bilateral obstruction* of the central retinal arteries in a man 50 years of age who was suffering from cardio-renal disease and hypertension

F H Rodin (Am J Ophth 10 753 (Oct) 1927) describes a case of obstruction of a branch of the superior temporal artery of the left eye which supplied the macula He remarks that the interest of the case lies in the fact that from the lower temporal border of the disc a cilio-retinal vessel extended towards the macula, and in consequence a portion of macular vision was retained In cases of *embolism* of the central artery of the retina, it is stated that the presence of a cilio-retinal artery, which occurs in 16 per cent, sometimes saves central vision

**COAT'S DISEASE**—L W Jones (Am J Ophth 11 1 (Jan) 1928) reports a case of retinitis with massive exudate and small changes in the blood-vessels in the right eye of a boy 9 years of age, whose only complaint was a swollen cervical gland The retina appeared to be detached along the course of the inferior temporal branch The general physical examination was entirely negative

Following a review of the literature,

he states that in von Hippel's disease the prominent feature is the blood-vessel change, whereas in Coat's disease it is the exudate, but the 2 conditions seem to be very similar In conclusion, he cites several cases in which improvement seemed to follow the injection of *tuberculin* though there was no change in vision

W. G Mengel (J M Soc New Jersey 25 788 (Dec) 1928) reports a case of retinal disease with massive *exudation* in a boy 6½ years old who was first seen after vision in the right eye had been failing for a year Microscopical examination showed marked disorganization of the retina Some of the larger vessels were enormously dilated, and the walls of the vessels showed marked disease changes, some of them presenting aneurismal dilatations

**DETACHMENTS**—M D Anklesaria (Indian M Gaz 64 186 (Apr) 1929) believes that detachment of the retina should be regarded as a sign rather than as a disease and suggests that it may be caused by a number of essentially different lesions He reports a case in a student, cure being obtained by medical measures combined with rest in bed Complete physical and physiological rest was enjoined Both eyes were bandaged, and injections of *saline solution*, commencing with 4 per cent and increasing to 10 per cent, were given in Tenon's capsule over the site of detachment Internally, the patient was given 7 grains (0.45 Gm) of *urotropine* twice daily, on account of its supposed salutary action on the secretions of the ciliary body, and a mixture containing *potassium iodide* and *sodium salicylate* with *salines*

W T Lister (Brit M J 2 1127

(Dec 17) 1927) in discussing detachment of retina, summarizes his remarks as follows

1 In retinitis striata and diffuse fibrous degeneration of the vitreous all treatment is useless

2 In detachment associated with a hole, treatment offers little hope of success

3 Definite fibrous bands in the vitreous may be divided

4 Detachment associated with retinitis or choroiditis should be actively treated

5 Simple detachment in which the mechanism of the detachment is not determinable should be given the benefit of the doubt and treated

6 Lastly, treatment, if attempted at all, should be thorough. The writer makes a plea for greater thoroughness in cases of detachment, which should include careful exploration of the vitreous with the slit-lamp by an expert

J A Van Heuven (Brit J Ophth 11 593 (Dec) 1927) discusses an operation to which the name "colmatage" has been given. In this procedure a triple row of punctures is made with the galvanocautery or the thermocautery in the sclerotic coat after the conjunctiva has been loosened around the cornea. The conjunctiva is then sutured in place. In practically every case of detachment of the retina the intraocular tension is lowered. After colmatage, the pressure is increased and the detached retina is pressed down against the wall of the eye. According to Lagrange, the increase in pressure after the operation is due to the formation at the cauterized spot of a constricting ring where the fluid of the eye normally escapes.

Favorable results cannot be ex-

pected from colmatage in cases of detachment of long standing, cases with extreme myopia or cases in which the lens is absent. In traumatic detachment of the retina in normal eyes, colmatage is more favorable than conservative therapy. Although reattachment may occur under treatment with rest in bed, bandaging, the use of atropine, etc., relapses almost always occur in such cases. Colmatage never has an injurious effect.

M N Beigelman (Arch Ophth 1 463 (Apr) 1929) attempts to draw conclusions as to the origin of acute hypotony in ordinary retinal detachment and states that it is comparable to the condition associated with perforation of the sclera with great loss of vitreous.

A Vogt (Schweiz med Wchnschr. 59 331 (Mar 23) 1929) reports 4 cases of detachment of the retina in patients with axial myopia in which on ophthalmoscopic examination some laceration of the retina was found. Through an incision in the conjunctiva and in the sclera, presumably corresponding to the site of the hole in the retina, a cautery was introduced into the eyeball, and the retina was cauterized as near as possible to the site of the laceration. After the operation the visual acuity in all patients rose from less than 0.1 to 0.7 or even to 1, and on ophthalmoscopic examination a scar was visible on the site of the laceration. The retina had assumed a normal or an almost normal aspect. The recovery is still present on the average of one and one-half years after the operation. In 4 similar cases the author observed a partial amelioration of the condition. The cure of detachment of the retina by the obliteration of the laceration

in the retina confirms the etiologic importance of trauma in the pathogenesis of detachment of the retina, even in so-called spontaneous forms of the condition

**CYSTICERCUS**—R Silva (Am J. Ophth 11 867 (Nov) 1928) reports 3 cases of subretinal cysticercus. In the first the cysticercus occupied the macular region and extended to the optic nerve. In its surgical removal, the external rectus was temporarily detached at its insertion, the eye strongly rotated nasally, and the sclera cautiously incised over the cyst until herniation of the choroid occurred. By careful manipulation, the cysticercus was then removed without rupture of the sac in spite of the presence of considerable fibrous tissue. Healing was uneventful.

In the second case the cysticercus had migrated from one position to another beneath the retina. It was removed by dissection of the sclera over its second position. Normal central vision was retained.

In the third case the cysticercus was free in the vitreous. Operation was refused. Five months later enucleation of the eye was necessitated by intense iridocyclitis. No evidence of suppuration was found. The pathological diagnosis was "dead cysticercus in the vitreous."

**HEMORRHAGE**—F W Lamb (Ohio State M J 24 949 (Dec) 1928), in discussing the diagnostic and prognostic significance of retinal hemorrhages, concludes that they may occur in any of the layers of the retina. Their anatomical location is an important factor in the prognosis as to vision.

Except in cases of obstruction or injury, the primary cause of retinal

hemorrhage is disease of the blood-vessel walls. They occur most commonly in nephritis associated with neuroretinitis. When there is a well-developed retinitis, the prognosis as to life is poor.

In arteriosclerosis, retinal hemorrhage is common and indicates that the blood-vessel walls are considerably weakened and that apoplexy is impending.

In diabetes, retinal hemorrhages are usually round and punctate and occur near the macula. The prognosis for life is better than in albuminuric retinitis.

In leukemia, the hemorrhages usually occur in the fiber layer and near the periphery and have a white spot in the center. The prognosis is poor for vision and life.

Hemorrhages seen in the retina in a case of anemia point to the diagnosis of pernicious anemia.

In thrombosis of the central retinal vein, hemorrhages are exceedingly numerous.

When the diagnosis of choked disc is uncertain, a hemorrhage at the margin of the disc eliminates the doubt.

Retinal hemorrhages occur in from 30 to 40 per cent of newborn infants. In such cases they usually become absorbed without loss of vision.

He suggests as an aid in the diagnosis and study of retinal hemorrhages the use of the red-free light in the ophthalmoscopic examination.

**INJURY**—Injury to the retina by light is not an unusual occurrence in patients exposed to ultra-violet light and among actors in moving picture studios where mercury vapor lamps are used. The severity of these burns may vary from mild congestion to

marked congestion with pain and edema

P Satanowsky (Arch d'Opht (Aug) 1928) examined 2 electricians whose eyes were congested and painful following exposure to an electric arc. The prognosis is good in these cases and treatment with **atropine** and a **light dressing** is usually all that is necessary

A J Bedell (Arch Opth 57 262 (May) 1928) reports a case of *traumatic retinochoroiditis* in a boy 15 years of age, and includes in his article a series of photographs of the fundus showing the progressive alterations in the retinal pigment after the injury

#### ALBUMINURIC RETINITIS.—

W M Beaumont (Brit M J 1 917 (May 21) 1927) reports the case of a man aged 37 years who suddenly lost the sight of the right eye 12 days before seeing the author. The loss of vision in this eye was due to *embolism* of the central artery of the retina. Vision of the left eye was 6/6. Six years later the patient was seen again with a diagnosis of Bright's disease associated with right total and left partial loss of sight. On examining the right disc no evidences of retinitis were found. The left showed an intense neuroretinitis. No retinitis appeared in the right eye up to the day of his death. He explains the absence of retinitis in the right eye on the basis that atrophy and necrosis of the retina were followed by fibrosis

**RETINITIS PUNCTATA ALBESCENS**—A Sowers (Am J Opth 11 4 (Jan) 1928) reports 2 cases of retinitis punctata albescens in members of a family, described by Lauber 17 years ago. In both cases, good vision had been retained but

there was hemeralopia. The fundus picture was practically unchanged

The condition is familial, congenital, and bilateral, and occurs in negroes as well as white persons. Consanguinity is an important factor in its development. Hemeralopia is found in two-thirds of the cases

The author discusses the differential diagnosis, and states that treatment with **arsenicals** and **mercury** is said to be beneficial

**TUMORS**—R F Moore and R S Scott (Proc Roy Soc Med 22 951, 1929) report 2 cases of bilateral glioma retinae. The patients were children 2 years and 6 months old respectively. In the first case both eyes were removed. In the second case only unilateral **enucleation** was done, as the parents refused to allow a bilateral operation

They believe that when removal of the eye is not permitted the best results are obtained by the introduction of **radium**, over the site of the growth, between the sclera and choroid

#### RHEUMATIC FEVER.—INCIDENCE—

Homer Swift (J A M A 92 2071 (June 22) 1929) calls attention to the change in mental attitude toward this disease, as shown by the tables of vital statistics, where within 30 years the nomenclature of acute articular rheumatism has been changed to acute rheumatic fever. The American Heart Association has gone a step farther and suggested the elimination of the word "acute." Such a condition allows us to study the chronicity of the disease, many so-called "complications" are really actual manifestations of the disease itself. The use of antirheumatic drugs and remedies, although they have brought some re-

lief to the patient, have befogged the situation so that we, as physicians, have not been able to observe the course of events as would have been the case had such remedies not been used. See also article on CARDIOVASCULAR SYSTEM, RHEUMATIC FEVER and CARDIOVASCULAR MANIFESTATIONS this volume.

A recent British investigation has brought to light the important fact that children who are treated in special convalescent homes and schools have less tendency to recurrence and those who are returned home are more susceptible to recurrences.

**ETIOLOGY**—Among the various organisms which have been demonstrated as having the capacity to cause polyarthritides, there are some which cause a serous inflammation of the joints similar to that seen in rheumatic fever, according to Swift (*loc cit*). This is frequently the case in the serous arthritis of the early stages of gonorrheal arthritis, but soon the joints subside, and there is gross destruction progressing in one joint.

A serous polyarthritides may be produced by *B. dysenteriae*, *B. melitensis*, *tubercle bacilli* and *Spirochæta pallida*, but in each case there are features which distinguish them from a true rheumatic fever. No filtrable virus has been found and practically every investigator has been compelled to study the *streptococci*. This organism, in one strain or another, has already been found to be the cause of erysipelas, scarlet fever, acute tonsillitis and septicopyemia. Of all the conditions thought to be due to the non-hemolytic form of streptococci, subacute bacterial endocarditis is the only one in which their causative rôle has been definitely proved.

In many cases of rheumatic infection there is a history of recurrent upper respiratory infection, but if we suspect the streptococci, we see that certainly not all cases whose upper respiratory tracts are infected suffer from a rheumatic infection. The occurrence of many cases in a single family suggests an inherited disposition to the infection.

Three hypotheses of the etiologic rôle of the *streptococcus* in rheumatic fever may be enumerated: (1) Elective localization, (2) specific streptococci elaborating a specific toxin to act upon the tissues and (3) rheumatic fever as an allergic condition. Of all these, the allergic phenomenon offers a reasonable explanation of these divergent observations but, of course, it is in no sense of the word a complete proof. It is the one theory which seems plausible and furnishes a field for investigation to which we may look for further advances.

Studying the bacteriology of rheumatic fever, R. L. Cecil, E. E. Nicholls and W. J. Stansby (*J. Exper. Med.* 50: 617 (Nov.) 1929) subjected 29 patients with acute rheumatic fever to blood cultures and found 9 or 31 per cent yielded a *streptococcus*. During the spring of 1929 blood cultures of 31 patients were studied and 26, or 83 per cent, gave a positive result for the streptococcus. This higher percentage of positives is believed by the authors to be due to improved cultural methods. Of the 35 strains of streptococci obtained, 33 have been classified as *Streptococcus viridans*, 1 as a *Streptococcus hemolyticus* and 1 as a *Streptococcus anhemolyticus*. In 7 patients subjected to culture of an affected joint 5, or 71 per cent, yielded the *Streptococcus viridans*. In 3 pa-



tients in whom the same organism was recovered from the blood and the joint fluid, agglutination and absorption tests proved the identity of the strains isolated from the 2 sources. From these observations it is difficult to escape the conclusion that rheumatic fever is a streptococcal infection, usually of the viridans type.

According to D. Riesman and J. C. Small (Ann Int Med 2:637 (Jan) 1929), the conclusion that rheumatic fever is an infectious disease cannot be doubted, also that it has a mild contagiousness. Its prevalence corresponds with the acute upper respiratory infections and many of the cases are ushered in by an attack of tonsillitis. The association of the streptococcus with rheumatic fever was first observed by Poynton and Payne in 1900, but the authors believe blood cultures in acute attacks are usually sterile.

A specific streptococcus isolated by Small from a typical case of rheumatic fever showed that it belonged to a distinct immunologic species. The same organisms were isolated from the throat cultures and also the feces in some cases of chronic arthritis. This organism has been given the name *Streptococcus cardioarthritidis*.

**PATHOLOGY**—In every instance, according to Swift (*loc cit*), the reaction as seen in the tissues to a rheumatic infection is a response to focal destruction of that tissue. In the myocardium, pericardium, synovial membrane and cardiac valves such nodules of reaction are seen. Closely following this tissue destruction there is an exudation of fluid and cells, as evidenced by periarticular swelling. The synovial cavity is distended with fluid containing fibrin

and large numbers of polymorphonuclear neutrophils. The characteristic of this disease is not the presence of this tissue reaction, but the intensity of it, and the rapidity with which it disappears spontaneously, or when the patient receives adequate doses of certain drugs.

Many instances and cases have been observed in which the growth and reaction of these subcutaneous nodules have been uninfluenced by the use of antirheumatic drugs. No doubt such a condition exists with visceral nodules.

The vascular involvement of rheumatic infection is of extreme importance and in some instances a plugging of the lumen followed by a canalization has occurred.

Understanding the nature of the tissue response puts us in a better position to comprehend valvular endocarditis. Swift (*loc cit*) states that of all the parts of the vascular system, none withstands more stress and strain than the valvular portion of the endocardium and thus is subjected to considerable damage and involvement by the agent causing rheumatic fever. The presence of small vessels in the valves of the fetus, which may be seen even in childhood and adolescence, gives rise to 3 sites for possible injury to the valves: (1) in the covering endocardium, (2) in and about the blood-vessels of the valves, and (3) from foci in the valve rings.

The results of numerous necropsies have demonstrated the primary condition of an interstitial valvulitis, even without any evidence of superficial involvement of the endocardium, in those cases terminating fatally early. Most convincing evidence has been developed recently to show that a

deep interstitial inflammation occurs in practically all the valves of the left heart in rheumatic carditis and in the majority of those in the right heart

To those advocates of the traumatic theory as the origin of valvulitis, the point of greatest injury is the line of closure of the valves and this is certainly the point at which most verrucæ are formed

**DIAGNOSIS.**—Studying the different forms or types of infection, Swift (*loc cit*) considers the monocyclic infection in which the typical symptoms and objective signs of a polyarthritis with fever and toxemia are present, running a self limited course, and ending in convalescence in 3 weeks. These are the types of cases which he believes are most benefited by **salicylate therapy**

In some instances, the use of salicylates has provided a false sense of security for both the patient and physician, and only after careful and diligent search is it possible for the latter to determine and seek out some of the apparently unimportant symptoms indicative of the presence of the infection. With each cycle in the infectious process there is greater opportunity for cardiac involvement. Many of these are determined only by electrocardiographic studies

In some instances, there is a polyarthritic type which seems to run a continuous irregular course, without any evidence of the presence of a resisting mechanism. Occasionally, a patient is encountered with polyarthritis, chorea, carditis and subcutaneous nodules, all occurring simultaneously

The importance of the visceral manifestations of rheumatic fever

cannot be too strongly stressed. If the laity and physician would rid themselves of the idea that "the patient had an attack of rheumatism from which he recovered but now has a complicating arthritis," there would be a distinct advance in the proper mode of thinking about this condition. Just as many cases of rheumatic infection manifest themselves by joint symptoms and those alone, there are other instances in which other symptoms develop indicative of rheumatic infection without any joint symptoms. Chorea is a most striking example of this condition.

The discovery and description of the submiliary nodule in the myocardium, as the evidence of focalization of a hypothetic virus, made possible a study of the evolution of this nodule. The establishment of the subcutaneous nodule opened a new field for the study of the bodily reactive powers to this agent. Also the redness and edema, which is periarticular, and the fluid from the joints furnish a favorite site for the study of the tissue reaction. Tonsils and adenoid tissue has further added to this wealth of material for the study of the pathologist

As might be expected, all cases do not show the same uniformity. Variations are the result of different tissue involved, the duration of the disease, the dose and concentration of the etiologic agent, and the variations in the virulence of the parasite

D. Riesman and J. C. Small (*loc cit*) enumerate a list of 10 clinical manifestations under the name of rheumatism. They also give a list of these conditions solely on the grounds of clinical findings. The recent clinico-pathologic studies have led

the authors to the now universal conception that rheumatic fever is not an acute condition, but rather sub-acute, or even chronic. The endocardial lesions, although seemingly stationary, give evidence of their activity by recurrent febrile reactions and leukocytosis. Even a rapid pulse and slight leukocytosis, in the absence of any valvular lesion, may demonstrate the presence of a smoldering infection.

**TREATMENT.**—Swift (*loc cit*) states that the observation that the intravenous use of small doses of streptococcus vaccines and nucleoproteins led to a change from a state of hypersensitiveness to one of hypsensitiveness in rabbits, led to the use of small doses in humans. In many cases, there was an improvement, but whether this can be laid to the vaccine, or whether it was the result of the natural course of events, cannot be determined. The tendency to relapses and the recurrence in patients who once had the disease make the evaluation of any form of treatment a most difficult problem.

Investigation for the present must proceed along the lines of as exact experimental work as can be devised in animals. Up to the present, the means of reducing hypersensitiveness to infection are (1) stopping the production of new foci of infection, (2) the elimination of foci already present, and (3) the intravenous desensitization of immunization with suitable antigenic substances. Thus, it is our problem to devise some method of building up the immunity so that the liability to renewed infection will be lessened, or, if reinfection occurs, the reactive powers of the tissue will

simulate that of immunity without hypersensitiveness.

Therapeutically, Riesman and Small (*loc cit*) consider that the passive immunity secured from injections of these anti-sera has been only of fleeting duration, while a more sincere attempt has been made to produce an active immunity from the use of repeated injections of small amounts of vaccine or the soluble products of the *Streptococcus cardioarthritidis*. A 1:10,000 dilution of the antigen is used and not more than 0.5 c.c. is used for the first injection and maintained at this dosage until no reaction following its injection can be detected. Gradually the dose is increased by 25 to 50 per cent of the dose last given. The subcutaneous injections are made at intervals of 5 to 7 days. The injections may be started as early as the third day or may be delayed until a period of serum sickness has passed.

It is not surprising that physicians have eagerly turned to any method of treatment that offers hope of lessening the duration and severity of this disease.

Summing up the opinion of the profession as a whole concerning the efficacy of certain streptococcus preparations for the treatment of rheumatic fever, it may be stated that the Council of Pharmacy and Chemistry of the American Medical Association decided that the usefulness of these preparations was insufficient to warrant their inclusion in New and Non-official Remedies. The experimental status of these products has been studied and, although they are suitable for controlled investigation by qualified experimental workers, propaganda inviting their use by the profession at large at this time is not justifiable.

**RHINITIS.—ACUTE —ETIOLOGY.**—Pfeiffer (M J and Record 130 497 (Nov 6) 1929) describes a micrococcus which has been repeatedly isolated and studied during the past 5 years in connection with investigations regarding the significance of bacteria in the etiology of acute rhinitis. The inoculation of freshly isolated strains of this organism into the nasal cavities of suitable subjects produced the typical clinical symptoms of acute rhinitis.

The etiology of colds has been held by J E Walker (J Infect Dis 44 254 (Mar) 1929)) as not being due to a specific virus, but a reaction that is brought on by many different bacteria. He reports the deliberate production of colds in a volunteer by injections of *Micrococcus catarrhalis* sprayed into the nostrils of the subject. The following day the patient had sneezing, profuse watery discharge, fulness of the head and nasal obstruction. By the third day the discharge was somewhat purulent and the fourth day it almost disappeared. Nine days later, the experiment was repeated without results, while 3 weeks afterward, a similar experiment brought about a reproduction of the symptoms in experiment 1. Infections due to *M catarrhalis* are entirely similar to those produced by *B influenzae* and *B bronchisepticus*. It would seem, then, that bacteria such as are cultivated from nasal exudate are primarily responsible for the symptoms of the irritating, uncomfortable and disagreeable head cold.

A study of the Gram-negative, filter-passing anaerobic organisms, described by Olitsky and Gates, and McCartney, was undertaken by K C

Mills, G S Shibley and A R Dochez (J Exper Med 47 193 (Feb) 1928) with a view to determining the general character of the organisms and their possible rôle in the causation of the common cold. Three outstanding facts are apparent from the study: (1) The organisms in question form a heterogeneous group, (2) they are nearly always present in the upper respiratory tract, and (3) there is a decrease in their incidence during colds. The reduction in their incidence in colds makes improbable the assumption that they bear a causal relationship to these infections. In fact, as pointed out above, this decrease is much more in keeping with the conclusion that they constitute part of the normal non-pathogenic flora of the upper respiratory tract, and would seem to bear no etiologic relationship to the common cold.

An artificial acidosis induced through the administration of ammonium and calcium chlorides causes all the symptoms of a cold in varying degrees from a single coryza to that of grippe, according to V S Cheney (Am J Pub Health 18 15 (Jan) 1928). The symptoms rapidly subside on the administration of sodium bicarbonate in large doses by mouth and by rectum.

**TREATMENT — Autohemotherapy** in spasmodic coryza has been used by A Llerena Benito (Arch de med, cir y espec 28 58 (Jan 14) 1928). His method of treatment consists in withdrawing 10 c c of blood from the vein of the elbow and injecting it without any further manipulation into the external aspect of the thigh. The injections are given every 2 or 3 days, from 3 to 5 usually being sufficient to produce a cure. The

treatment was combined with resection of the nasal spurs, not only to re-establish permeability of the nostrils, but also to modify the hypersensitiveness of the nasal mucous membrane. It was found that better results were obtained by this combined treatment than by resection or cauterization alone.

Irradiation from the quartz lamp in the control of common colds has been used by G. H. Maughan and D. F. Smiley (Am. J. Hyg. 9:466 (Mar.) 1929). They found by observation of a group of persons susceptible to colds that a 10 to 16 minute exposure of the naked body (from 5 to 8 minutes front, and from 5 to 8 minutes back) during the dark months of the year, to the rays of an ordinary mercury vapor lamp, once a week, at a lamp table distance of 30 inches, will in most instances reduce by at least 40 per cent the incidence of colds in cold-susceptible persons. Since lack of ultra-violet irradiation is only 1 of several known factors involved in reducing bodily resistance to acute respiratory infection, the control of this factor alone must not be expected to be a complete panacea for the prevention of colds. The results reported by the authors would, however, appear to justify the use of short weekly irradiations with ultra-violet rays in certain cases of marked susceptibility to colds, in which even a 40 per cent decrease in the frequency of colds would be appreciated.

Sodium bicarbonate is advised by V. C. Cheney (*loc. cit.*), who gives an initial dose of 60 grains (4 Gm.), followed by 30 grains (2 Gm.) every 2 hours for 6 doses, and then 20 grains (1.3 Gm.) every 3 hours during the waking period until the cold is checked.

The administration of the sodium bicarbonate should always be in, or followed by, a large glass of hot water. Locally, he sprays the nose and throat with an alkaline solution, 1 dram (4 Gm.) of sodium bicarbonate to 1 pint (500 c.c.) of water, morning and night.

Vaccine treatment in colds and asthma associated with colds has been reported by I. C. Walker (Arch. Int. Med. 43:429 (Apr.) 1929), who studied 97 patients treated periodically with a vaccine consisting of the most prevalent types of streptococci for each respective period. Eighteen per cent of the patients were free from colds and asthma associated with colds, 12 per cent were practically free, 19 per cent had only 1 or 2 colds during the period of from 3 to 5 or more years that they were treated or under observation, and 10 per cent were free from colds for a year or more following each course of vaccine. Therefore, 59 per cent of the patients obtained either freedom or comparative freedom from colds and asthmatic colds for periods of a year or more following each course of vaccine. In 16 per cent, the patients required a course of vaccine oftener than once a year, their freedom from colds varied from 6 to 11 months after each course of treatment. Walker states that since the prevalence of the various types of streptococci varies from year to year, it is advisable constantly to study the sputum and the nasal secretions of patients with colds. It is essential to do so each fall, in order to know the prevailing varieties of streptococci for the ensuing cold period of the year.

**ATROPHIC (OZENA).—TREATMENT**—F Leiri (Finska lak-sällsk handl 70 372 (May) 1928) had good results in his 3 cases of atrophic rhinitis (ozena) treated for a long period with a 1 per cent solution of **pilocarpine** in combination with irrigation with a solution of 1 per cent **potassium sulphocyanate** and 2 per cent **potassium iodide**. No toxic effect from the pilocarpine was noted.

The principle of narrowing the nasal chamber is the basis for surgical procedures in treating ozena. **Implantation of ivory** is the simplest and mildest operation and requires very little after-treatment. In J I Kemler's (Arch Otolaryng 10 61 (July) 1929) experience this method of treatment has been the most satisfactory.

L Hubert and G A Robinson (Arch Otolaryng 10 166 (Aug) 1929) advocate **radium** treatment for ozena. The authors have reported favorable results on 5 patients thus treated. In their cases the mucosa was left more healthy and much less crusty. They do not claim a complete cure by this method but all the cases treated have been greatly benefited.

S Grauer (Strahlentherapie 31 801 (Mar) 1929) obtained excellent results with **x-rays** in 3 of 4 cases of ozena which had been treated without success by various other methods. The author uses 2 technics. In one, the nasal cavity is irradiated in 1 field and in the other it is irradiated in 3 fields.

**HYPERTROPHIC — TREATMENT**—Chronic hypertrophic rhinitis has been treated successfully with **zinc ionization**. Collot (Vie méd 10 365 (Apr) 1929) has employed a

modification of Friel's zinc ionization method for over 8 years with much benefit to his patients. His method consists in the application of **high frequency currents**, **salicylate ionization**, and **vibrating massage**. The high frequency currents are applied by a MacIntyre electrode of such a form that it can be applied to all points of the mucosa. The number of treatments varies according to the case, but an average of 20 is usually necessary. These should be given daily at the commencement of treatment, but at longer intervals later.

**RICKETS — ETIOLOGY AND PATHOGENESIS**—In the etiology of rickets hereditary factors seem to be creeping in as a persistent possibility. On the other hand, this idea is somewhat discounted by the fact that dietary habits are passed on and hence the thing may be familial instead of inherited.

According to A F Hess and M Weinstock (Am J Dis Child 36 966 (Nov) 1928), the individual predisposition to rickets lies in other factors than pre-natal hoarding of the essential vitamins. Long wet seasons and high humidity favor the development of rickets. This is attributed by Greifswald (Deutsche med Wchnschr 55 436 (Mar 15) 1929) to undue absorption of the ultra-violet rays by the atmospheric moisture. This not only affects humans but also their food supplies.

An interesting concept of the pathogenesis of rickets is that of A B Marfan (Presse méd 37 749 (June 8) 1929). He suggests that the disease may be produced by chronic infections and intoxications if they act during bone development. This is

particularly significant during the last weeks of intra-uterine life and the first 9 months of extra-uterine. He names the agents in order of importance as follows: congenital syphilis, tuberculosis, prolonged bronchopneumonia, and persistent skin infections.

**DIAGNOSIS.**—In the x-ray diagnosis of rickets in young infants J. V. Greenebaum, T. K. Selkirk, A. G. Mitchell and R. A. Bier (Ohio State M. J. 25:34 (Jan.) 1929) stress particularly the appearance of fraying of the end of the ulna and occasionally of the radius. In some cases, enlargement of the costochondral junction is exhibited. C. U. Moore (J. Bone and Joint Surg. 10:96 (Jan.) 1928) believes that the skeletal signs of rickets are most evident at times of rapid skeletal growth, *e.g.*, during the first 2 years of life and at puberty. These signs are: craniotabes in the first 6 months, the rosary and Harrison's groove in the first year, genu valgum or varum in the second year, and static flat-foot at puberty. Footprints do not give consistent pictures of flat-foot. A positive reaction is evident if the child stands on the balls of the feet and the scaphoid bone becomes prominent when the youngster comes down on the entire sole.

**PROPHYLAXIS AND TREATMENT.**—Marfan (*loc. cit.*) attributes the therapeutic action of irradiated ergosterol to a protective action against the toxins. Irradiated milk has been used with reported success in the prophylaxis of rickets. Treatment of infants with ultra-violet rays is also beneficial. This obviously should be done cautiously. The experience of A. Hottinger, at Basle

(Abh. a. d. Kinderheilk. 20:1, 1928) was that the best treatment for prophylaxis was the irradiation of the body for 6 weeks or the administration of irradiated food. In the United States there is now available for the treatment of this disease a specific curative agent which has been named Viosterol by the Council on Pharmacy and Chemistry of the American Medical Association. This is irradiated ergosterol.

According to T. Baumann (Monatsschr. f. Kinderh. 39:193, 1928) the anemia which obtains frequently in rickets is not to be taken as one of the specific symptoms but as a sequel of a diet low in iron. This contention is based on the fact that whereas the disease is healed within 4 to 6 weeks by direct or indirect irradiation therapy, with the use of an exclusive milk diet, the anemia persists. On the other hand, the associated anemia may be avoided or cured by the use of a mixed vegetable and fruit diet or metallic iron (ferrum reduction 0.2 Gm.—3 grams—*t. i. d.*). Energetic iron therapy is indicated in infants where a rich vegetable diet can not be given.

**RINGWORM.—DIAGNOSIS.**—N. Gray Hill (Brit. J. Child Dis. 25:54 (Jan.-Mar.) 1928) states that the use of Wood's glass affords an easy and certain method of diagnosing ringworm even when it is in the earliest stages and provides a ready method of telling when a child is cured.

D. S. O'Connor (U. S. Nav. M. Bull. 27:641 (July-Oct.) 1929) has shown that when scrapings from a patient with ringworm are mounted in from 20 to 30 per cent potassium hydroxide and allowed to stand for

from 2 to 24 hours, the organism can be readily found. When these dried cultures are replanted they grow abundantly and renew their activity, which illustrates that drying is not lethal. The chief site of infection found amongst University of California students, is between the toes, particularly in the third and fourth interdigital spaces, and frequently involves the nails.

The clinical types observed by R. T. Legge, L. Bonar and H. J. Templeton (J A M A 93 170 (July 20) 1929) are chiefly the sodden interdigital, vesicular and the eczematoid types.

In quite a number of cases a mixed infection with bacteria takes place and a lymphangitis and adenitis may be present.

**TREATMENT.**—C. White (J A M A 90 1865 (June 9) 1928) suggests that circulatory impairment might be a factor favoring fungus activity. Accordingly, he concludes that intravenous injections of 20 per cent **sodium citrate** with local application of usual fungicides overcomes the infection.

B. F. Feldon (Arch Dermat and Syph 17 182 (Feb) 1928) reports 36 single-dose cures out of 47 children treated by **thallium acetate**, while V. Pardo-Castello, J. J. Mestre and E. Rio (Arch Dermat and Syph 19 409 (Mar) 1929) state that the **x-ray** is the method of choice for scalp treatment in spite of the simplicity of thallium treatment, since it has yet to be determined whether

the apparently temporary effects of the latter are followed by any permanent injury to the endocrine sympathetic system.

Experiments made by Kingery and Adkisson (Arch Dermat and Syph 17 499 (April) 1928) establish the fact that aqueous solutions of **thymol**, **cinnamon** and **clove**, in the order named, are superior to other medicaments commonly used as fungicides.

**ROENTGEN RAYS.** See X-RAY AND RADIUM THERAPY.

**RUBELLA (GERMAN MEASLES).**—Rubella is not always a mild disease, as demonstrated by P. E. Carrieu, L. Lamy and P. Bouchet (Presse méd 36 274 (Mar 3) 1928). These authors reported that of 20 patients with this disease 3 died, 2 had marked adenopathy with supuration and several others had unusually high temperatures. The patients who died were aged 4½, 5½ and 18 years respectively. T. Pitten (Arch f Kinderh 86 114 (Jan 15) 1929) described an instance in which purpura hemorrhagica occurred on the 8th day after the onset of rubella. The blood platelets were reduced to 120,000 per cmm and the bleeding time was increased to 32 minutes. Definite microscopic changes occur in the skin of patients with rubella as well as in certain other diseases characterized by skin eruption, according to von B. Lipschutz (Wien klin Wchnschr 41 365 (Mar 15) 1928).



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**SALVARSAN.—PHYSIOLOGICAL ACTION**—F Jimenez de Asúa and M J Kuhn (Rev Soc argent de biol 4 124 (May) 1928) state that the *salvarsans* stimulate the reticulo-endothelial system to greater activity and this is in great measure responsible for the effectiveness of the arsenical compounds in the treatment of syphilis. By experimentally injecting animals, the spleen, liver, lymphatics, etc., were found to have an increased number of these special cells, apparently called forth by the arsenical.

E W Kassatkin, A J Grubina and S M Melbart (Ztschr f klin Med 110 596 (May 31) 1929) found that injections of *arsphenamine* usually cause an increase of urobilin content of the stool, the urobilin content of the urine, and the number of reticulocytes. These changes are expressions of increased hemolysis and regeneration of the blood.

The experimental work done by F A McJunkin (Am J Syph 12 365 (July) 1928) would indicate that a non-syphilitic lesion of the liver, whether acute or chronic, is in itself not a contraindication to the *arsphenamine* treatment of the individual's syphilis.

F W Oelze (Dermat Wehnschr 86 89 (Jan 21) 1928) found that the *Spirocheta pallida* disappeared from superficial lesions after 2 days in 96 per cent of cases when treated with 0.6 Gm (10 grains) injections of *neo-salvarsan*.

**UNTOWARD EFFECTS AND POISONING**—W J O'Donovan (Brit Med J 2 742 (Oct 27) 1928) reports 4 cases: (1) postarsphenamine melanoderma, (2) postarsphenamine maculomelanoderma with follicular hyperkeratosis, (3) multiple subcutaneous abscesses associated with exfoliative dermatitis, and (4) cutaneous and subcutaneous necroses, with arsenical exfoliative dermatitis.

E L Zimmermann (Arch Ophth 57 509 (Sept) 1928) states that the following types of ocular reaction may occur on the administration of *arsphenamine*: (1) A direct toxic effect of the drug on the normal eye. The only true toxic reactions involving the normal eye occur in the form of conjunctival hyperemia. Such reactions

may damage vessels already involved by cardiovascular and renal disease, but there is no evidence that a normal vessel, nerve or retina is ever affected, (2) Jarisch-Herxheimer reactions in the form of an intensification of an active lesion, the activation of a quiescent lesion, or changes in structures previously presenting no clinical evidence of a pathological process, and (3) neurorecurrences and iridorecurrences or ocular lesions following insufficient treatment of primary or secondary syphilis with the arsphenamines. In resuming activity, the surviving organisms encounter a defenseless host and the resulting reaction is a marked one producing a neurorecurrence in the form of an optic neuritis, paralysis of the internal or external ocular muscles, or an iridorecurrence.

In the United States Navy Medical Bulletin (27 778 (July-Oct) 1929) a report is given of a marine private, aged 28 years, who had been treated for lues, over a period of 2 months, during which time he was given 8 intravenous injections of *neo-arsphenamine* and 10 intramuscular injections of mercury. He presumably received about 57 Gm (1½ drams) of neoarsphenamine and 0.65 Gm (10 grains) of mercury. It was stated that no reactions of jaundice were noted during the course of treatment. Five days after he received his last injection, he was admitted to the sick bay complaining of headache, dizziness, nausea, vomiting, weakness, and pain in the lumbar region. Urinalysis showed red and white blood cells and a trace of albumin and sugar. The white blood count was 16,000, blood sugar was 266 mgs and the blood-pressure was 140/70. He developed convulsions, became comatose, and moist râles were detected at the bases of his lungs. Marked cyanosis was found limited to the head and the region above the clavicles. He had a suggestive Babinski reflex. The knee jerks were stronger in the left than in the right knee. A clinical diagnosis was made of acute encephalitis, acute unclassified nephritis, and pulmonary edema, with the possibility of a complicating bronchopneumonia, and cerebrospinal syphilis. Death took place 1 day after admission to the hospital. On autopsy

the following conclusions were drawn. The findings, which are consistent with poisoning by neoarsphenamine, are pulmonary edema and focal hemorrhages in the cortex and base of cerebrum and cerebellum, associated with absence of an inflammatory reaction. The apparent absence of conspicuous liver lesions and associated jaundice is apparently due to the rapidly fatal outcome. The picture is encephalitis, acute, hemorrhagic, toxic, presumably delayed arsenic poisoning. It was stated that many syphilographers deem the administration of a mercurial conjointly with an organic arsenical preparation, as an extra hazardous procedure.

### SCARLET FEVER.—ETIOLOGY.—PREDISPOSING CAUSES—

Race plays an important part as a predisposing factor in scarlet fever. It has long been recognized that certain races are less susceptible to scarlet fever than others. The colored race, in particular, is known to possess this type of racial immunity. The observations of H. L. Higgins (Ohio State M. J. 24: 543 (July) 1928) substantiate this fact. P. Heinbecker and Edith I. M. Irvine-Jones (J. Immunol. 15: 395 (Sept.) 1928) made immunologic studies on a group of Eskimos in a country where scarlet fever was clinically unknown. The negative Dick reactions, as well as the presence of scarlet fever antitoxin in the blood obtained in these subjects, were interpreted as indicating a natural hereditary immunity.

In view of the fact that natural immunity against scarlet fever is usually present in the young infant, it is interesting to note that the new-born frequently show negative skin reactions (G. F. Dick and Gladys H. Dick, Am. J. Dis. Child. 38: 905 (Nov.) 1929). However, according to J. V. Cooke (Am. J. Dis. Child. 34: 969 (Dec.) 1927), this lack of skin

sensitivity is not (necessarily) due to the presence of antitoxin. From somewhat similar observations, L. Ribadeau-Dumas, C. Zoeller and J. Chabrun (Rev. franç. de pédiat. 5: 334 (June) 1929) concluded that in nurslings negative Dick reactions are not necessarily associated with humoral immunity to scarlet fever. These authors believe that the skin of the new-born infant is not so sensitive to bacterial toxins as is that of the adult. Cooke observed, further, that during the first months of life, skin sensitivity appears in a larger proportion of infants who had no antitoxin in the blood at birth, than in those whose blood contained it.

**THE SPECIFIC CAUSE** of scarlet fever is now generally considered to be a *hemolytic streptococcus*. A. H. G. Burton and A. R. Balmain (Lancet 2: 545 (Sept. 14) 1929) found hemolytic streptococci present in the fauces in 79 per cent of a group of 265 cases of scarlet fever, at the time of admission to the hospital. G. Moriwaki (J. Bact. 18: 139 (Sept.) 1929) cultured the throats of 273 patients with scarlet fever. All but 7 of these, who had the surgical type of the disease, had positive hemolytic streptococcic throat cultures. Six of the patients with surgical scarlet fever were found to harbor hemolytic streptococci in suppurating lesions, instead of in the throat. In one such case this micro-organism could not be found, but the *staphylococcus aureus* was cultured from the surgical lesion.

U. Friedemann (Lancet 2: 211 (Aug. 4) 1928) was inclined to deny that the occurrence of hemolytic streptococci in the throat is in itself, of diagnostic value, on the other

hand, the absence of these micro-organisms makes the diagnosis of scarlet fever improbable. This author found that 100 per cent of a group of convalescent patients had hemolytic streptococci in the throats 6 weeks after the onset of the disease. E Korobkova and S Mitine (Rev de microbiol et epidemiol 6 474, 1927) observed that hemolytic streptococci were present in the throats of patients with scarlet fever from 14 to 20 days after the onset in 55 per cent of the cases, from 21 to 30 days in 42 per cent. From the scales of patients convalescing from scarlet fever, hemolytic streptococci were cultured in 37 per cent of the cases. (The value of this finding is questionable in view of the fact that it is probably due to simple contamination). Fifty per cent of healthy persons, living in contact with patients who had scarlet fever, were found to harbor hemolytic streptococci. H N von Zettmar (Ztschr f Hyg u Infektionskr 107 265, 1927) found this type of micro-organisms present in all of a group of 120 cases of scarlet fever.

It was quite resistant to drying. Cultures dried on cotton and kept in the dark at room temperature, were found to remain alive for over 6 months, and the power to produce toxin was apparently unaltered.

**DIAGNOSIS**—There is still some doubt as to whether or not the specific causative agent of scarlet fever is a distinct and separate strain of hemolytic streptococcus. F Green (Canad M A J 19 431 (Oct) 1928) concluded that the uniform results obtained with the complement *fixation test*, using antigens prepared from the scarlatinal hemolytic streptococcus, seemed to confirm the

theory that this micro-organism is the causative agent of scarlet fever. The author found that a negative result was the rule in the first week of the disease, as well as after the sixth week during convalescence. Von Naumann (Ztschr f Kinderhr 48 157, 1929) obtained somewhat similar results with this test, although the negative results were usually obtained in the fourth week of illness.

Katherine M Howell and Marie Werner (J Infect Dis 43 525 (Dec) 1928) found that the *opsonification test* afforded a rapid and valuable aid in the diagnosis of scarlet fever, although the test was not absolutely specific for the scarlatinal hemolytic streptococcus.

According to A B Wadsworth (Am J Pub Health 19 1287 (Dec) 1929), there is no definite evidence that a particular strain of streptococcus is the incitant of scarlet fever. Morphologic, biologic, serologic, and immunologic characteristics of approximately 400 strains of streptococci obtained from different sources failed to distinguish any distinct group of infectious processes. About 65 per cent of all toxins, irrespective of whether the source of the strains was a scarlet or non-scarlet infection, were neutralized by control antitoxic serum produced by a single strain. G Moriwaki (*loc cit*) observed that toxins of non-scarlatinal hemolytic streptococci can be neutralized by scarlet convalescent serum, though with less constancy than that of the scarlatinal type. He found, too, that erysipelas antitoxic serum will neutralize the toxin of scarlet fever. However, G F Dick and G H Dick (*loc cit*) found that the soluble toxins produced by scarlet fever and

by erysipelas hemolytic streptococci are immunologically specific and distinct

According to G. Moriwaki (*loc cit*) toxins of non-scarlatinal hemolytic streptococci are capable not only of rendering a positive Dick reaction negative, but also, when injected in sufficient quantities to a susceptible person, can produce a rash identical with that caused by the hemolytic streptococcus of scarlet fever. The author concluded that scarlatinal hemolytic streptococci consist of those strains which possess a stronger tendency to cause a rash in the human subject, and also a stronger antigen for the blanching phenomenon.

A great deal of confusion still exists concerning the intrinsic nature of the toxin of the scarlatinal hemolytic streptococcus. Many investigators believe that the poison, although thermostable, is a soluble true toxin or exotoxin, comparable to that of diphtheria. According to J. V. Cooke (*Am J Dis Child* 35: 991 (June) 1928) there are 2 distinct phases in infection with toxin-producing hemolytic streptococci in persons without a rash. Contact infection with invasion of tissues, usually faucial and pharyngeal, first occurs. After this infection, the specific toxic syndrome (scarlet fever), produced by absorption of the streptococcic protein (toxin) appears, but only in those persons who may be anaphylactically hypersensitive to this protein. Others in whom this hypersensitivity may be masked by specific circulating antibodies, are immune to the specific intoxication, and have only the non-specific phenomena of pyogenic infection.

The *Dick test*, depending upon the

author's understanding of the nature of scarlatinal streptococcic toxin, is subject to 2 interpretations. According to prevalent opinion, the Dick test indicates the presence or absence of antitoxin to the scarlatinal toxin. However, some authors believe the reaction to be allergic in nature. C. W. Duval and R. J. Hibbard (*J Exper Med* 46: 397 (Aug) 1927) stated that experimental evidence clearly indicated that the Dick toxin and intracellular derivatives of the streptococcal cell are of the same nature. J. V. Cooke (*loc cit*) thought that the filtrate of this micro-organism used for the Dick test contained a protein antigen rather than a toxin. K. Ando (*J Immunol* 17: 361 (Oct) 1929) recently isolated from the Dick toxin 2 substances, exotoxin and bacterial protein, with which skin reactions can be produced. The skin reaction to the bacterial protein seemed to indicate a state allergic to this antigen, while the reaction to the exotoxin was interpreted as indicating susceptibility to the specific exotoxin of the scarlatinal streptococcus.

*Pseudo-Dick reactions*, according to the usual opinion, occur rather infrequently. F. von Groer, conforming to his belief that the Dick reaction is an allergic phenomenon, stated there is no such thing as a pseudo-Dick test (*Monatschr f Kinderh* 37: 558, 1927). According to W. H. Park and May C. Schroder (*Am J Pub Health*, 18: 1455 (Dec) 1928), the Dick test and the control test give identical reactions. It is, therefore, impossible to say whether the test is a pseudo-reaction indicating immunity or a combined reaction indicating susceptibility. In children who have

had no vaccination for scarlet fever, there are few pseudo-reactions, but in those who have received the large injections of vaccine now in vogue, the author obtained a good many pseudo-reactions. Consequently, the Dick test as a retest is less reliable, because of the occasional difficulty of separating the toxin reaction from the pseudo-reaction. An added difficulty is that even boiling for 3 hours does not destroy all the toxin. The incidence of pseudo-reactions varied considerably with different preparations of the toxin. Nils Malmberg and G. Jacobsohn (*Acta pædiat* 6: 442, 1927) found that pseudo-reactions were especially common in children who were hypersensitive to tuberculin.

There are, of course, other sources of error associated with the *Dick test*. Attempts to sterilize the syringes and needles with alcohol, which precipitates the toxin, failure to replace the water left in the needle, after boiling, with skin-test solution, boiling the syringes and needles in alkaline tap water instead of distilled water, estimating the dosage of the toxin solution by the size of the wheal produced in the skin, instead of accurate measurement by graduations on the syringe, subcutaneous instead of intracutaneous injection, and failure to observe the reaction between 18 and 24 hours after the test is made (Dick and Dick *loc cit*). The commonest error of all is the interpretation of positive reactions as negative. The skin reaction in scarlet fever toxin never shows induration. The reactions should be read in bright light. The *slightest flush or reddening, no matter how faint the color*, constitutes a positive reaction, if it measures as

much as 10 mm in any diameter. Again, the toxin itself may be at fault (Park and Schroder. *loc cit*). As the toxin can only be properly tested in the skin of human beings, it is not apt to be as thoroughly tested as the diphtheria toxin. It is also conceivable that previously Dick-negative persons may develop scarlet fever as the result of infection with certain rare strains of scarlatinal hemolytic streptococci, whose toxins are not used in the preparation of Dick skin test material, E. Gorter, M. de Korte and J. Munk (*Acta pædiat* 6: 383, 1927) as well as J. V. Cooke (*loc cit*) observed that measles may temporarily abolish the Dick reaction.

R. Cruickshank (Glasgow M. J. 109: 46 (Jan.) 1928) concluded that the *Dick test*, from a diagnostic point of view, was of limited value, since a portion of scarlet fever patients are Dick-negative at the onset of the infection, while others fail to become Dick-negative during convalescence. Theoretically, all scarlet fever patients should be Dick-positive during the first few days of illness and become negative in from 10 to 14 days after the onset. However, the author believed the test of value in determining when immunity has developed and how long it persists. In a series of 182 cases of scarlet fever, most of which were of a mild character, L. Abramson (*Acta pædiat* 7: 138, 1927) reported that the Dick test yielded irregular results. A change from an originally positive reaction to a subsequently negative one was found in 42 per cent of the patients, the change occurring sometimes in the second or third week, but often not before the eighth or even twelfth

week. In 27 per cent the test remained positive as long as the patient remained in the hospital, and in 22 per cent, it remained negative throughout. Persistently negative reactions were not found in children from 1 to 3 years of age. There were 7 patients whose tests, originally negative, later became positive. E. Gorter, M. de Korte and J. Munk (*loc cit*) stated that while the test is not an absolute criterion of immunity, it is, however, the most useful indication of susceptibility we have at the present time. Park and Schroder (*loc cit*) also found the Dick test to be almost but not quite as reliable as the Schick test. According to Dick and Dick (*loc cit*) the reliability of the skin test in determining the susceptibility to scarlet fever is shown by the results in 20,856 persons with spontaneously negative reactions. With the possibility of 1 exception, all passed through 1 epidemic of scarlet fever, and some went through several epidemics, without contracting the disease. A group of 2157 pupil nurses and internes with spontaneously negative Dick tests were allowed to go on duty in contagious disease services. In spite of prolonged and intimate exposure to scarlet fever, none of this group contracted the disease.

*The Schultz-Charlton Reaction*—According to J. A. Toomey (Am J Dis Child 35 607 (Apr) 1928), many antitoxins now on the market produced little or no blanching. Furthermore, not all antitoxins, even if they do give rise to a positive Schultz-Charlton reaction, will produce blanching to the same degree when the same person is used for all tests. Even though there is blanch-

ing after injection of antitoxin, it does not always last as long as the rash. Many antitoxins cause local redness at the site of injection, instead of blanching. J. A. Toomey and Myron H. August (Am J Dis Child 38 953 (Nov) 1929) observed that the blanching power of certain placental serums was greater than that of most scarlet fever antitoxins, and equaled that of the convalescent scarlet fever serum used in their experiments. The blanching power of a given serum is not directly proportional to its dilution or concentration, and with very dilute solutions, the results are quite unreliable. If the serum is diluted, it matters little whether the strength used is 1:10 or 1:100. The most accurate results, however, are obtained with the undiluted serum. The time limit between the initial injection and the appearance of blanching varied within wide limits—1 hour to 48 hours. The Schultz-Charlton technic, according to these authors, cannot be regarded as even a rough method of estimating the potency of serum.

**INFECTIVITY**—Under ordinary conditions, according to G. F. Dick and Gladys H. Dick (*loc cit*), not more than 10 per cent of those who come in contact with patients having scarlet fever become infected, but in institutions where the inmates are in contact with one another during most of the 24 hours, more than 50 per cent may become infected during a prolonged epidemic. R. Weigert (Monatschr f Kinderh 42 469, 1929), from a clinical study, concluded that scarlet fever is not contagious in the incubation period. During the prodromal period, the disease is mildly contagious, but not

nearly so much so as during the stage immediately following the exanthem

The transmission of scarlet fever by means of healthy *carriers* was demonstrated by Ruth Tunnichiff and J. T. Crooks (J A M A 92 1498 (May 4) 1929). The source of several cases of scarlet fever in a children's ward was traced to scarlet fever streptococci found in the throat of a healthy attendant. After removal of the tonsils and adenoids, hemolytic streptococci disappeared and no more cases of scarlet fever developed. A short time later a similar experience occurred. In all, 14 cases of scarlet fever were traced to 3 healthy carriers. *Milk-borne* epidemics of scarlet fever continue to occur. According to C. Scamman (Am J Pub Health 19 1339 (Dec) 1929), 87 outbreaks of scarlet fever from this origin took place in the United States during 1928.

**PROPHYLAXIS—ACTIVE IMMUNIZATION**—As determined by G. F. Dick and Gladys H. Dick, the doses of the sterile scarlatinal toxin for active immunization should be graduated, beginning with 500 skin test units in the first injection, and increasing to 80,000 or 100,000 skin test doses in the last. The injections are made subcutaneously at intervals of one week. If the full amount is given at each injection, the 5 doses may be counted on to immunize completely 95 per cent of susceptible persons, and to modify considerably the susceptibility of the rest. Two weeks after the last dose is given, another skin test is made, using 0.1 c.c. (1 skin test dose) of the skin test solution on the right arm, and 0.2 c.c. (2 skin test doses) on the left arm. If the reaction on either arm is

positive, the fifth dose is repeated. Unless the immunization is carried to the point of a negative skin reaction, complete protection against scarlet fever cannot be expected, although the severity of a subsequent attack would be modified by the partial immunization. J. V. Cooke (Am J Dis Child 35 974 (June) 1928) observed that in over one-third of the persons treated, the reaction to the Dick test disappeared 24 hours after the injection of the toxin, and in most of the remaining cases, the reaction was much modified. However, neutralizing antitoxin was not found in the blood coincidentally with the decrease in or loss of skin sensitivity, but was demonstrable only in the third or fourth week after the injections were started. After a few weeks, there was a tendency for the decrease in skin sensitivity to be less marked. The author interpreted these results as indicating, first, a desensitization of body cells anaphylactically sensitive to the scarlatinal streptococcic filtrate and, somewhat later, with continued absorption of antigen, a development of specific antibodies.

*Reactions* may occur during the immunization. Dick and Dick (*loc cit*) found that in a large series of cases, including highly susceptible persons, general reactions may be expected after each dose in about 10 per cent of the cases, although this 10 per cent is not composed of the same persons following the different doses. The most highly susceptible persons usually react more strongly to the first dose, others may not have any reaction until the fourth or fifth dose is given. As a rule, reactions after the last and largest dose are fewer

and milder than after the smaller first doses W Benson (Edinburgh M J. 35 617 (Nov) 1928) observed that, in most cases constitutional symptoms occurred in those persons who had large, brilliant, scarlet red reactions to the Dick test. The immunization injections in patients having such marked reactions were, as a result, modified by giving smaller initial doses

The increase in number of injections according to A B Wadsworth (*loc cit*) takes time, which is a practical difficulty Attempts have been made in such preparations as Larson's ricinoleated toxin, and in anatoxins, to so modify the scarlatinal toxin that the size of the immunizing dose may be increased and the number of the doses decreased without impairing the effectiveness of the treatment Dick and Dick (*loc cit*) employed Larson's material in 3 doses of 1 cc each and found that it caused more severe reactions than those following the graduated doses of toxin The skin test did not become negative in any of the susceptible persons who received the Larson preparation, and on subsequent exposure to scarlet fever, a number of them developed this disease M A Zelikina and D A Kuritzina (Mikrobiologicheskii 6 63, 1928 from J A M A 91 65 (July 7) 1928) were able to lower materially the toxicity of scarlet fever toxin prepared according to the method of Dick, without decreasing the antigenic property This was achieved by the addition of 1 per cent formaldehyde solution and by keeping the toxin in a thermostat at 40° to 42° C for 5 weeks The administration of large doses of this anatoxin on 2 occasions, 4500 skin

test doses at the first injection and 30,000 at the last treatment, resulted in conversion of a positive Dick reaction to a negative one in a high percentage of cases, without producing marked reactions in the patient

The *nasal mucous membranes* were treated with scarlet fever toxin by B A Peters and S F Allison (Lancet 1·1035 (May 18) 1929) in an attempt to produce an active immunity By their method, the nose was first sprayed with a solution of 1 per cent sodium taurocholate for the purpose of aiding absorption, after which the nasal passages were sprayed with the scarlet fever toxin The treatment was given every other day At the end of 5 weeks a considerable number had developed immunity The authors suggested spraying the nose twice a week for a period of 8 weeks

The *duration of active immunity* after toxin injection has not as yet been established (Wadsworth *loc cit*) The duration as well as the degree of immunity (Dick and Dick *loc cit*) depend on the amount of toxin injected Retests made at intervals of 1, 2 and 3 years, indicate that more than 90 per cent of those immunized to the point of an entirely negative skin reaction retain their immunity Between 5 and 9 per cent do not, and consequently require a second immunization

**PASSIVE IMMUNIZATION**, conferred by the injection of scarlet fever antitoxin, according to E Gabriel (Jahrb f Kinderh. 125 1 (Sept) 1929) seemed to be of some value as a prophylactic measure J A Toomey (J A M A 91 1599 (Nov. 24) 1928), on the other hand,



has not been favorably impressed with the procedure E James (Lancet 1 227 (Feb 4) 1928) found that 5 c c of the concentrated scarlet fever antitoxin is usually sufficient to protect susceptible scarlet fever contact cases for a minimum period of 1 week Probably 10 c c is necessary for protecting those showing a strongly positive Dick reaction Rene Martin and A Laffaille (Bull Soc de pédiat de Paris 26 364 (July) 1928), at the onset of epidemics of scarlet fever in 2 children's institutions, picked out the susceptible children by means of positive Dick tests Antitoxin administered to this latter group rendered the Dick test negative in all but 1 of the children The tests remained negative for 3 weeks, after which time the reactions became positive again, and several children developed scarlet fever Dick and Dick (*loc cit*) have found by means of nose and throat cultures on blood agar plates, skin tests in susceptible persons, and the use of antitoxin prophylactically in infected susceptible persons, that it is possible in a group small enough to test and culture in 1 day, to bring an epidemic of scarlet fever under control in 48 hours The passive protection conferred by a prophylactic dose of any antitoxin is transient, lasting at the most from 2 to 3 weeks Active immunization with the toxin should be begun in the infected susceptible persons 1 week after the prophylactic dose of the antitoxin is given

In view of the frequent persistence of hemolytic streptococci in the throats of convalescent, hospitalized, scarlet fever patients previously noted, Burton and Balmain (*loc cit*) and Friedmann (*loc cit*) concluded

that in the open wards, constant reinfection takes place. Burton and Balmain were of the opinion that the present system of nursing scarlet fever patients in general wards will ultimately have to be discontinued in favor of cubicled wards Friedmann organized an intermediate block to which patients having only a few hemolytic streptococci in the throat were admitted This author has made it a practice to dismiss patients from the block, irrespective of the stage of illness and desquamation, if 3 consecutive negative throat cultures have been obtained

There seems to be some indication that *tonsillectomy* decreases the susceptibility to scarlet fever A D Kaiser (J A M A 89 2239 (Dec 31) 1927) found that scarlet fever occurred in 76 per cent of those who had had their tonsils removed, and in 16 per cent of those who had not undergone tonsillectomy Furthermore, the former group had fewer cardiac complications than the latter Among 1013 patients with scarlet fever observed by J Zikowsky (Wien klin Wchnschr 42 37 (Jan 10) 1929) only 23 had previously had their tonsils removed The disease appeared milder and the complications fewer in number in the tonsillectomized group It could not be determined whether the low incidence of scarlet fever among the latter group of patients is due to the fact that persons whose tonsils have been removed are less susceptible to scarlet fever infections, or to the circumstance that only a small percentage of the population of Vienna undergo tonsillectomy

**SERUM TREATMENT**—The results reported from the use of scar-

latinal streptococcic antitoxin were often in striking contrast. In the main, these results have been interpreted in the light of the effect of the serum on the toxemia of scarlet fever, including the fever, eruption and duration of the acute stage, on the complications of the disease, and, finally, the effect upon the mortality rate.

P Nobecourt, R Martin, P R Bize and L. Laffaille (*Presse méd* 36 1201 (Sept 22) 1928) as well as F von Bormann (*Deutsche med Wchnschr* 55 1414 (Aug 23) 1929) reported a definite improvement in the toxic symptoms following the administration of scarlet fever antitoxin. The serum, according to W Stoltenberg (*Munch med Wchnschr* 76 360 (Mar 1) 1929), seemed to be of particular value in those toxic cases showing severe cerebral symptoms. Sixty per cent of the toxic or severe cases reported by N T Welford (*Am J Dis Child* 37 553 (Mar) 1929) seemed to be benefited by this form of therapy. J E Gordon, B B Bernbaum and L C Sheffield (*J A M A* 90 1604 (May 19) 1928) reported that scarlet fever antitoxin exerted a favorable effect in reducing the severity of the febrile stage, and also on the course and duration of the fever and on the extent and duration of the skin lesions. U Friedmann and H Decker (*Deutsche med Wchnschr* 54 863 (May 25) 1928) found the eruption disappeared within 48 hours after injection of the antitoxin in 90.7 per cent of the patients, and within 24 hours in 58.8 per cent. If the serum is injected on the *first day* of the appearance of the rash, the temperature will probably come to normal in 2

days (V S Stone *M J Australia* 2 194 (Aug 10) 1929). R Cannon Eley (*Am J Dis Child* 35 14 (Jan) 1928) observed that not only did the temperature fall to 100° F or less, but the entire clinical picture was changed. The rash faded more rapidly, the subjective symptoms disappeared, and the patients felt improved. The author advised that if improvement did not occur after 48 hours, a second dose of antitoxin should be given. H S Banks and J C H Mackenzie (*Lancet* 1 381 (Feb 23) 1929) treated 404 cases of scarlet fever by administering the serum *intravenously* up to 5 or 6 days after the onset, and it was felt that the acute stage could be even more curtailed than by the intramuscular method of administration. The intravenous injections were followed in fully 60 per cent of the cases by rigor and rise in temperature. The color of the patients not infrequently was poor and the pulse rapid. The reaction passed off within about half an hour and the patient generally fell asleep.

J A Toomey (*J A M A* 91 1599 (Nov 24) 1928) stated that scarlet fever is a self-limited disease, the acute symptoms lasting from 2 to 7 days, with the temperature coming down by crisis or lysis about the fourth day. In reviewing the literature concerning serum therapy, this author noticed that most observers failed to give the length of time the patients were ill before receiving antitoxin. Where this data was given, it was surprising to find that the temperature came down about the time that it was usually expected to drop in scarlet fever cases not treated with serum. Toomey has yet

to see the data of a series treated with intramuscular injections of scarlet fever antitoxin which could not, without much discredit, be matched with a series of his own cases, not treated with serum E Gabriel (Jahrb f Kinderh 125 1 (Sept) 1929) emphasized the fact that a definite answer to the question of the value of serum treatment in scarlet fever can be given only on the basis of a comparative study of serum treated cases with those not receiving antitoxin, occurring in the same epidemic of scarlet fever. Although the number of patients observed was too small to make the results of the study conclusive, the figures at least indicated that the enthusiasm of some investigators with regard to the efficacy of antitoxin therapy in scarlet fever is unjustified, in spite of the fact that the serum seemed to shorten the duration of the fever.

The treatment of scarlet fever of average severity with serum therapy seems to be empirical. J A Toomey (J A M A 91 1599 (Nov 24) 1928) stated that in most of his cases there was more illness from the effect of the serum sickness than from scarlet fever. He asks the question, is it worth while, then, to inject all our patients with serum, in the face of the mildness of the present type of scarlet fever just to see them better a day or two sooner, and have serum sickness, or would it be better to leave them alone and take chances on the average case of the disease? U Friedmann and H Deicker (*loc cit*), however, could see no reason why serum treatment should be reserved for severe cases.

F von Bormann (Deutsche med Wchnschr 55 1414 (Aug 23) 1929) found that while in the mild cases the serotherapy is omitted, a case should not be too quickly diagnosed as being mild, because patients who, on the first day appeared mild, frequently became extremely toxic on the second or third day. Dick and Dick (*loc cit*) too, pointed out that the serum should not be withheld until the attack is a severe one, but should be given in time to prevent the development of a severe attack. They believe that scarlet fever antitoxin may be employed therapeutically with advantage in all cases of scarlet fever as soon as the appearance of the rash suggests the diagnosis. Given early in adequate doses, the antitoxin gave brilliant results. The longer the patient goes without antitoxin, the less he benefits from it when it is given. While beneficial effects could be obtained when the injections were made as late as the fourth day of the illness, according to U Friedmann and H Deicker (*loc cit*), the best results were obtained when the injection was made in the first 24 hours of the illness. B Johan (Monatschr f Kinderh 37 536, 1927) observed the serum to be almost ineffective when given after the fifth day of the disease. F von Bormann (*loc cit*) furthermore found that if the injection is made after the toxic period, or if it is employed in treating the mild case of scarlet fever, it not only may be ineffective but may also increase the virulence as well as the complications of the disease.

The effect of scarlet fever antitoxin on complications of the disease seems to depend, among other things, upon

the character of the latter W Stoltenberg (*loc cit*) as well as J E Gordon, B Bernbaum, and L Sheffield (*loc cit*) believed that the administration of scarlet fever antitoxin decreased the complications of this disease A H G Burton and A R Balmain (*loc cit*) found that the serum not only markedly reduced the number of toxic complications, but also, in a lesser degree, those of septic origin However, according to P Nobecourt, R Martin, P R Bize and A Laffaille (*loc cit*), the antitoxin is ineffective in the treatment of the suppurative complications, the secondary infections, and septicemic syndrome of scarlet fever, although they found there was considerable improvement in the toxic condition, if the antitoxin was administered early in the illness Gabriel (*loc cit*) reported that in a group of patients that did not receive antitoxin, 71 per cent developed complications, while in another group, receiving serum, only 60.5 per cent developed complications However, in an additional 8.5 per cent of the latter group there occurred definite symptoms of serum sickness, bringing the total percentage of cases of complications in these patients to 69 per cent W Stoltenberg observed that in cases of scarlet fever with severe sore throat, adenopathy, and beginning otitis media, serum therapy was of little value According to this author, scarlet fever antitoxin is contraindicated in cases with arthritis, because the articular symptoms frequently become more severe as a result of the injections.

The effect of scarlet fever antitoxin on the mortality rate is not always

easily demonstrated In infectious diseases, according to P Nobecourt, R Martin, R Bize and A Laffaille (*loc cit*), it is difficult to assert that a drug is truly active since nature and spontaneous cure must always be considered Particularly in scarlet fever it is difficult to determine at the beginning that a case is of the malignant type The fact that the patient gets well, therefore, does not prove the efficacy of a serum Nevertheless, it is permissible to say that in certain cases the action of the scarlet fever antitoxin appears very favorable However, as J A Toomey (*loc cit*) has asserted, since the introduction of this specific therapy occurred at a time coincident with a general decline of the mortality rate in scarlet fever, any indication that scarlet fever antitoxin reduces the mortality rate is not convincing

On the other hand, V S Stone (*loc cit*) seemed to be satisfied that the mortality from scarlet fever will be practically wiped out by the routine use of serum in severe infections Certainly the results obtained by N T Welford (*loc cit*) were encouraging, in that the mortality rate in a group of severe cases of scarlet fever was about one-half that of a similar group not treated with serum Not only the serum but the method of administration of the antitoxin seems to affect the death rate B Johan (*loc cit*) stated that the mortality of his severe cases treated with immune horse serum was 6.9 per cent when the treatment was intravenous and 13.0 per cent when the antitoxin was given intramuscularly The mortality rate in a control group of severe cases not treated with serum was 20.2 per cent

**SCHIZOPHRENIA (DEMENTIA PRECOX).—PHYSICAL STUDIES**

—K M Bowman and A F. Raymond (*Am J Psychiat* 8 901 (Mar) 1929) compared the history and physical findings of 1196 cases of schizophrenia with 836 cases of manic depressive psychosis and 412 cases of paresis. They found that in general physical findings the first 2 groups resembled each other, but differed from the third group. W. Feinstein (*Arch f Psychiat* 85 329, 1928) states that some disturbance of pupillary reactions is found in most cases of dementia precox, paresis and imbecility. He believes that these disturbances have a physiological basis. The leukocyte count in the 3 groups was similar. The first 2 groups showed fewer cases of alcoholism than the paretic group. Pregnancies, births and living children were fewer among the schizophrenics. This seems to be because schizophrenics do not tend to marry since those who did, showed as many pregnancies as were found in the manic depressive and paretic groups.

E M Westburgh (*Arch Neurol and Psychiat* 22 453 (Sept), 719 (Oct) 1929) examined the psychogalvanic responses in normals, paretics, manic depressives and schizophrenics. Profound catatonic precox patients showed increased resistance to the passage of a weak electric current and also gave the smallest galvanic deflections to test words. Schizophrenics in general gave smaller deflections than the other groups. The greater the deterioration the smaller the deflection.

**ENDOCRINOLOGICAL STUDIES**—McCartney (*Endocrinology* 13 73 (Jan-Feb) 1929) states the litera-

ture and his studies support the concept that schizophrenic patients consistently show endocrinopathy, that the disease is primarily one in which the gonads are consistently degenerated or hypofunctioning. Twenty-three eunuchs showed typical schizophrenic or schizoid character. Of 70 living schizophrenic males, 60 per cent. were eunuchoid in type and only 57 per cent had normal testes. Of 40 living schizophrenic females, 52.2 per cent. had undoubted ovarian disease. Pathologic examination of 158 males and 24 females with schizophrenia disclosed marked endocrine changes, although these changes were only consistent in the gonads. Only a small percentage had normal suprarenals. All cases of catatonic dementia precox showed normal or hypertrophied thyroids. Myocardial degeneration was present in a large percentage. Almost every patient had a history of having had one or more severe toxemias. He believed that supplying the endocrine deficiency should assist in the social adjustment of schizophrenics.

R G Hoskins (*New England J. Med* 200 361 (Feb 21) 1929) reports a study of the basal metabolism in 206 schizophrenics. Nearly half gave readings below 90 per cent. In 80 more cases 54 per cent gave readings below the lower limit of normality. He points out that the sex life and habitus are frequently abnormal, which correlates with the fact that the primary sex glands very commonly give evidence of degenerative change or of a plastic development. Similarly, degenerative changes in the adrenals, pituitary and thyroid are common. It cannot be determined from the available evidence, whether these changes are characteristic of schizo-

phrenia or incidental to the nutritional state, or the intercurrent diseases from which the patients die. The majority of investigations lean to the latter opinion.

E W Lazell and L H Prince (U S Vet Bur. M Bull 5 40 (Jan) 1929) state that the blood of patients suffering from dementia precox contains a soluble substance of endocrine origin which is lethal to embryonic cells.

P Deuticke (Wien klin Wchnschr 42 1475 (Nov 14) 1929), in reporting a case of hyperthyroidism in a schizophrenic, points out that such a condition is rare in dementia precox.

**HEREDITY.**—W S J Shaw's (Brit M J 2 566 (Sept 29) 1928) experience with the peculiar incidence of dementia precox among the Parsees of Bombay compels him to the opinion that inbreeding is a very definite cause of the disease. The Parsees constitute a small and very clearly differentiated group in the Indian population. Among them marriage with outsiders and proselytism are strongly discouraged.

P Alvarez Nouvilas (Siglo med 83 457 (Mar 16) 1929) reports that among 2000 schizophrenic patients the disease was never associated in father and son, but was in mother and son or daughter. He reports 3 groups of this kind. He concludes that direct inheritance is unquestionable, the transmission occurring through the mother rather than the father.

**PATHOLOGY.**—Alford (J Nerv and Ment Dis 68 594 (Dec) 1928) believes that the pathologic process in schizophrenia and epilepsy is an abiotrophy. The deterioration of epilepsy and the mental disturbances of dementia precox are instanced as

signs of the degenerative process affecting probably some of the structures at the base of the brain.

C B Bamford (J Ment Sc 75 120 (Jan) 1929) believes that schizophrenia has a characteristic pathology consisting of infantilism of the cardiovascular system, general fibrosis of all the organs including the endocrine glands, and a large complex type of cerebrum.

V M Buscaino (Rev di pat nerv 34 181, 1929) has collected the results of recent neurochemical and neuropathological researches. He states that Jacobi and Winkler found, by encephalography, dilatation of the lateral ventricles and large fluid spaces over the cortex. The atrophy was more marked in the frontal lobes and more frequent in paranoid cases. Marchand occasionally found increase in spinal fluid pressure in the early months of the disease. Walter (corroborated by Hauptmann, Kral, Malamud and Guttmann), by the bromide method, found decreased permeability of the meninges. Opinion is divided concerning the protein. Marchand finds it sometimes increased in the early stages and Kafka finds this increase constant, whereas others find no increase. Globulin is sometimes increased, according to most of the authors cited, particularly Kafka. The proportion of globulin to total protein is somewhat higher than normal. Ratner found deviations in the colloidal gold curve in all of 12 cases, whereas Bowmann found negative results in all of 20 cases. With colloidal benzoin, the reactions gave negative results. Kaltenbach found 6 abnormal curves in 33 cases by the normo-nastic reaction. The paraffin reaction was reported as negative, Pandy's

reaction was almost negative, likewise Weichbrodt's

Buscaino's silver nitrate reaction showed a black color in 1 and maroon in the other of 2 cases. The normal reaction is grayish or faintly reddish. The reaction with syrup of citric acid, as carried out by Pages, Benoit, Pelissier and Jaulmes, was positive in 5 of 13 cases of dementia precox and negative in 15 healthy persons. Vizioli, by the potassium bichromate test, found 4 positive results among 9 patients. Kral found hemolysin in traces in 2 of 25 cases. The Wassermann reaction was positive only when syphilis coexisted. Pleocytosis, taking the normal as 1 cell per cmm, is noted graphically. Winkler found that the absorptive power was considerably increased in 80 per cent, more so in the later stages of the disease.

A number of authors have described thickening of the meninges with mild cellular infiltrations, which they think are important indications of morbid processes going on in the cranial cavity. Mild proliferation of the adventitia of the blood-vessels has been reported a number of times. Perivascular deposits of lipid material are found frequently, together with irregularly distributed areas of hyperemia and anemia.

Developmental anomalies in the brain have been scarce. Atrophy of the ganglion cells with lipid infiltration practically to the point of disintegration, vacuolar degeneration, and chronic cell disease have been reported by most authors, who have studied the brains in such cases. Funfgeld found sclerotic alterations in the cells, with more or less abundant lipid change in the later stages of the disease.

In the early cases there is a filamentous transformation of the protoplasm, with disappearance of the Nissl bodies and scattering of dark granules, especially at the base of the cell. There are thinning of the nuclear membrane, condensation of its chromatin and a tendency for this to become confused with the surrounding protoplasmic mass. The localization is principally in the third and fifth layers. The intracellular fibrils and neurofibrils sometimes appear swollen. Increase in the protoplasmic glia and glia nodules is reported by Munzer, and "infectious nodules" by others. Rarefaction of the intracortical and subcortical nerve fibers with deposits of metachromatic granules, is described in other cases with swelling of the axoplasm, vacuolization and accumulations of granules and other substances in the vacant spaces.

In the basal ganglia, the alterations are less notable than in the cortex. Areas of grapelike disintegration are found in a considerable number of cases in both the thalamus and the striatum. The grapelike areas of disintegration may not be characteristic of dementia precox, but are indicative of serious degeneration in the brain. The floor of the third ventricle shows pathologic alterations in certain cases. In the cerebellum Cajal describes unequivocal signs of degeneration and destruction of cells and fibers, and conclusive signs of regeneration and repair of the dendrites. The medulla, spinal cord and ganglia seem fairly normal. In the sympathetic ganglia, however, according to Dide, there is infiltration of granules in the protoplasm and its prolongations, with considerable swelling in the early

stages and atrophy in the later stages. The pericellular reticulum is broken up and then seems to disappear. The connective tissue of the capsule reacts. In the ependyma and choroid plexus, Funfgeld frequently finds vacuolization of the epithelium, with some hyalinization, proliferation here and there, and in 1 case, cystic degeneration. The subependymal neuroglia is thickened in certain places according to Steck. Thus, it would seem that dementia precox is constantly, and from the beginning, accompanied by pathologic variations in the chemistry and structure of the nervous system.

**DIAGNOSTIC TESTS**—L. Kan-  
ner (Am J Psychiat 8 75 (July)  
1928) reports that the injection of  
1 c.c. of epinephrine hydrochloride  
solution 1:1000 yielded typical vago-  
tonic blood-pressure curves in 34  
selected cases of schizophrenia and  
believes that the test should be made  
part of the routine examination of  
cases of dementia precox. On the  
other hand, M. L. M. Northcote (J  
Ment Sc 75 114 (Jan) 1929) found  
nothing characteristic in the reaction  
of patients with schizophrenia to ad-  
renalin or pilocarpine.

**PSYCHOPATHOLOGY**—J. R.  
Ernst (M J and Rec 128 381 (Oct  
17) 1928) believes that paranoid de-  
mentia precox has always a (latent)  
homosexual basis and that the best  
results will be obtained by recognizing  
and treating the symptoms in  
early childhood. G. Zilboorg (J  
Nerv and Ment Dis 68 370 (Oct)  
1928, Am J Psychiat 8 733 (Jan)  
1929) believes that 50 per cent of  
puerperal psychoses show schizo-  
phrenia reactions. They occur in  
women usually toward the middle or

end of the third decade of life who  
have shown schizoid characters before  
the psychosis. These women are sex-  
ually frigid, chronic masturbators  
(arrested before the vaginal stage is  
reached) and potentially homosexual  
(although this does not appear except  
in the psychosis). They wish to be  
male, rather than female, and because  
in the Oedipus situation they identify  
themselves with their father and are  
vengeful to males because they  
themselves are not male. They seek  
little contact with man, seldom marry  
before 25 to 35, and then marry after  
a prolonged courtship. There is usu-  
ally a momentary sexual awakening,  
with perhaps the first vaginal orgasm  
just prior to the outbursts of the  
psychosis, and then they attack the  
husband or his penis. They are usu-  
ally multipara but 3 to 10 years  
elapse between pregnancies and dur-  
ing this period they tend to with-  
draw from domestic interests. The  
prevention of this condition lies in  
the study and treatment of sexually  
frigid women. Frigidity of women is  
a common expression of certain psy-  
chodynamic constellations some of  
which are benign, some ominous.

**TREATMENT**—F. von Horanszky  
(Arch f Psychiat 84 181, 1928)  
used artificially induced sleep, organo-  
therapy and metallic salts. As a  
purely symptomatic treatment he  
found prolonged sleep, induced ac-  
cording to Schafgen's method, of con-  
siderable value. His experiences with  
organotherapy were not encouraging.  
Treatment with metallic salts (chiefly  
manganese) produced improvement,  
but no full remission.

Reed (Canad M A J 21 46 (July)  
1929) treated 30 patients with intra-  
venous injections of 2 to 8 c.c. ( $\frac{1}{2}$



to 2 drams) of a molar solution of manganese chloride, giving 30 injections in 15 weeks followed by 0.3 Gm (5 grains) manganese chloride by mouth twice a day for a month. Their physical condition improved and he believes that these patients showed a higher discharge rate than similar patients not receiving this treatment. W. Dodel (Munch med Wchnschr 72 1462 (Aug 28) 1925) found immediate improvement in schizophrenic excitement from intravenous injections of **afenil** (a calcium preparation).

K. Schroeder (Ugesk f laeger 91 519 (June 20) 1929) reports that out of 6 schizophrenics treated by fever produced by the deep intramuscular injection of **sublimed sulphur in olive oil**, 3 were greatly improved and 2 slightly improved. C. D. Leake, M. E. Botsford and A. E. Guedel (California and West Med 31 20 (July) 1929) found that brief periods of inhalation of 30 per cent or more **carbon dioxide** with **oxygen** induces short periods of mental clarity and intelligent responsiveness in dementia precox catatonia. J. G. Livshitz (Russk klin 11 72 (Jan) 1929) observed considerable amelioration in the mental and physical condition of 20 out of 40 patients treated with **cerebrotoxin** (cerebrotoxin is prepared by injecting an emulsion of healthy human brain into horses).

O. Lingjaerde (Nord med tidsskr 523 (Aug 17) 1929) reports that 13 out of 20 schizophrenics improved under intensive treatment with **thyroid gland** pushed until the basal metabolism was over 110 to 115 and the pulse rate over 80 to 100. Better results were obtained when the thyroid medication was supplemented by

**liver**. Hoskins and Sleeper (Endocrinology 13 245 (May-June) 1929) report 50 per cent of patients who showed endocrinopathy improved under endocrine (**thyroid, pituitary and gonads**) **therapy** in contrast to improvement in only 5 out of 39 of the group that showed no endocrinopathy. K. M. Bowman (J Nerv and Ment Dis 70 353 (Oct.) 1929) found no improvement following intravenous injections of **parathormone** and **calcium lactate** by mouth. L. E. Housie (Psychiat Quart 3 5, 1929) reviews the status of recent methods of therapy. He believes that patients with schizophrenia form a wide and varied group and that a single therapeutic approach is ill advised. The status of biological processes in treatment is uncertain, except where there is definite malformation of one of the endocrine organs. Prolonged narcosis has proved of value but there is no safe method. **Serotherapy, treatment of focal infections and physiotherapy** are useful only if such intervention is specifically indicated. **Occupational therapy** is only an adjunct to other forms of treatment. A broad psychobiological approach is the most valuable.

A. A. Brill (Am J Psychiat 9 519 (Nov) 1929) states that although Freud advised against the psychoanalysis of schizophrenics, because the disease process itself was an effort at adjustment on the part of the patient, he has had some success with the use of a modified technic in mild cases. He believes that the acute case should be hospitalized, and an attempt made to understand the patient's conflicts. The hospital physician should watch and guide such patients after discharge—perhaps for the rest of their lives.

**SCIATICA.—ETIOLOGY AND PATHOGENESIS.**—There appears to be a decided swing from the conception of sciatica as a “neuralgia” of doubtful etiology to the idea that it is secondary to some toxic state and especially to osteoarthritis changes in the pelvis and spinal column

A Josefson (Nord Bibl f Terapi, vol vi, 1927), like Hellweg, F Lindstedt and other Scandinavians, still consider sciatica as a muscular affection and advocate the therapeutic application of heat and rest. Other investigators, especially British and American, regard sciatica as being produced by pressure in the osseous apparatus and less commonly toxic in origin. F H Hiller (Wien med Wchnschr 79 1255 (Sept 28) 1929) stresses the importance of the etiologic diagnosis in sciatica. He cites 1 case of sciatic pain where the uric acid content of the blood was 7.5 mgm. In another patient the cause was alcoholic addiction. A third patient recalled an attack of acute appendicitis and the removal of an encapsulated appendix cleared up the sciatica. Other causes found in his series of cases include gonorrheal infection in the adnexa, pus in tonsils and teeth, arthritic processes in the spine, hip joints and pelvis, tumors of the vertebræ, etc. This author stresses the fact that in the investigation of sciatica, the neurologist must have a thorough knowledge of internal medicine.

The importance of arthritic changes is stressed by a number of investigators. W Yeoman (Lancet 2 1119 (Dec 1) 1928) in a study of the relation of arthritis of the sacro-iliac joint to sciatica, reviews 100 cases of

sciatica admitted to the Royal Bath Hospital, Harrogate, England. In 36 per cent arthritis of the sacro-iliac joint was found. Yeoman ascribes the sciatica to joint distention, with pressure upon the lumbo-sacral cord and spasm of the pyriformis muscle. Sacro-iliac strain is regarded as a rare predisposing cause.

V Putti (Lancet 2 53 (July 9) 1927) maintains that sciatic pain is symptomatic of vertebral arthritis excepting in those rare cases in which it is a symptom of a neuritis of specific nature. Sciatica is a neuralgia caused by a pathological condition of the intervertebral foramina and especially of the intervertebral articulations.

Somewhat similar conclusions are made by M Grossman and M Keschner (Arch Neurol and Psychiat 21 398 (Feb ) 1929) from a review of 317 cases of sciatic syndrome. These authors consider the term “sciatica” misleading, as it tends to draw attention away from the most common and remediable underlying cause of the various clinical conditions characterized by pains in the lower part of the back and limbs. In the absence of a polyneuritis or polyradiculitis, from whatever cause (toxic, infectious, metabolic, constitutional, vascular), a primary mononeuritis or radiculitis of the sciatic nerve is extremely rare. In practically all of the authors' cases, the sciatic syndrome was secondary to some pathologic process in the osteo-arthritic structures or their contiguous soft parts in the region under discussion. Cases in which the patients have paroxysmal attacks of lancinating or shooting pains in the lower part of the back and in the lumbosacral distribution, without ob-

jective evidences of involvement of the lumbosacral roots or nerves, or of the osteo-arthritic structure or their adjacent soft parts (muscles, tendons, fascia) in this region, should be designated as "*sciatic neuralgia*." The fact that only 3 true cases were found in a series of 317, indicates the rarity of the condition, notwithstanding that most authors emphasize its frequency and employ the term "*sciatica*" as if it were synonymous with "*sciatic neuralgia*." There are a certain number of cases in which the sciatic syndrome may appear as an early and prominent feature of a clinical picture, the underlying cause of which is a neoplasm of the spine, pelvis, cord, meninges or roots. The fallacy of designating these cases as "*sciatica*" is self-evident. Except in such rare cases as sacralization of the fifth lumbar vertebra, or calcification or ossification of the soft parts, or in primary or metastatic, neoplastic or tuberculous processes in the spine or pelvis, positive roentgen observations of spondylitis or arthritis, are not conclusive as to the etiologic relationship of these conditions to the sciatic syndrome.

A Feiling (Brit M J 1 386 (Mar 10) 1928) divides the sciaticas into symptomatic or secondary forms, due to some gross pressure lesion, and primary or essential forms. In the former, he includes symptoms belonging to gross lesions of the spinal cord. He divides the essential group into neuritis and sciatic neuralgia. The neuritides include the toxic cases, not infrequently of diabetic origin and seldom relieved by removal of foci of infection. The sciatic neuralgias are

the most common and may manifest themselves as

(a) "*Radiculitis*" when the root is involved in the theca or the sub-arachnoid space as seen in tabes, herpes zoster and spinal meningitis. In true cases of radiculitis, the spinal fluid shows a lymphocytosis.

(b) "*Funiculitis*" when the lesion is in the funiculus—that portion of the nerve root between the posterior root ganglion and the nerve plexus. This portion lies in the bony intervertebral canal. The scoliosis seen in these cases of sciatica, as claimed by Sicard and Putti, is due to nature's attempt to relieve the tension in the area by a wider separation of the vertebræ. The spinal fluid in these cases shows an increase in albumin without a lymphocytosis.

(c) "*Peripheral*" type in which the nerve trunk itself is affected in contradistinction to radiculitis and funiculitis, which he terms as "*central sciaticas*." He regards Putti's views on the central sciaticas as correct (*vide supra*).

Spinal fluid changes in sciatica are reported by V. D. Kunitzyn (Sovrem Psichonev., vol VII, 1928). Root symptoms were found in 51 cases and in 21 cases the spinal fluid showed a definite increase in albumin and globulin, with a slight increase in cells and no change in the Lange colloidal reaction. When the disease affects only the nerve trunks there are no changes in the spinal fluid, hence the presence of such changes indicates root involvement. Sicard and Roger made similar observations in 1918.

**DIAGNOSIS.**—H. Fritz (Beitr. z. klin. Chir. 143 652, 1928) is of the opinion that cases are often wrongly diagnosed as sciatica. He differentiates 50 conditions that simulate sciatica and cites a number of cases illustrating the points of differentiation.

W. Krebs (Deutsche med. Wchnschr.

54·1754 (Oct 19) 1928) points out that sciatica is often erroneously diagnosed in cases of hip joint and sacroiliac disease

A Frenkel (Zentralbl f Chir 55 274 (Feb 4) 1928) reports 4 cases of sciatica commonly secondary to other diseases. These cases included chronic abscess of the buttock, a post-typhoid spondylitis, a uterine carcinoma and a sarcoma about the hip.

Unrecognized forms of root sciatica are reported by N Gierlich (Med Klin 24 1621 (Oct 19) 1928). Root sciatica affecting the fifth lumbar and first sacral nerves is easily confused with inflammation of the peripheral terminal branches of the sciatic nerve in the calf of the leg and the foot. Characteristic of root sciatica is severe pain on pressure at a point about 3 cm lateral to the spinal process of the fifth lumbar vertebra. In all severe cases there is paresis of the peronei with reaction of degeneration. Weakening of the plantar reflex speaks for root involvement. Hot applications, galvanization, diathermy and intra-neural injections have value only when they are applied to the point of tenderness on the course of the diseased root, not to the periphery.

K Bragard (Munch med Wchnschr 75 387 (Mar 2) 1928) states that *Lasegue's sign* is regularly positive in sciatica but it is also positive in several diseases which have nothing to do with the sciatic nerve, but which are often confused with it. The pressure point of the nerve must be found for diagnosis and in order to distinguish the pressure-sensitive nerve from the soft parts, the skin should be made smooth with grease or paraffin. The pressure point in the fora-

men ischiadicum is not dependable, for here pain on palpation is often produced by myogelosis (hard spots in muscles, described by Lange in 1925) in the gluteal musculature which covers the nerves. Generally, the diagnosis is facilitated by less constant signs, such as irritation symptoms in the nerve (prickling, formication, furry feelings) modification of the reflexes (increased tendon reflexes in recent cases, disappearance in old cases) especially diminution of the Achilles tendon, scoliosis ischiadica, atrophy of the leg, pain on coughing and straining (especially at defecation) and, more rarely, sensory disturbances. The customary treatment of sciatica with "heat in any form" and antirheumatic remedies fails entirely in the myogeloses.

F Turyn (Munchen med Wchnschr 76 834 (May 17) 1929) describes a new symptom of sciatica. The patient should be lying flat on his back with his legs completely extended. On the side where he feels the neuralgic pains, the big toe is bent backward. In a case of sciatica, the patient will complain of pains in the gluteal muscle. The dorsal bending of the big toe stretches the medial and the lateral plantar nerves, which are branches of the tibial nerve. This stretching causes a displacement of the tibial fibers in the sciatic trunk of the gluteal muscle. In instances of trauma of the gluteal muscle in which the sciatic nerve is not injured *Lasegue's sign* is often positive but the symptom described by the author remains negative.

D A Schambouloff (Arch Neurol and Psychiat 21 392 (Feb) 1929) asserts that a series of motor phe-

nomena are usually to be observed in some cases of sciatica, especially in acute cases. Some of these phenomena are seen in trunk and root sciatica (*Kernig* and *Bechterew signs*), and some in root sciatica alone (symptoms of contralateral sciatica and motor symptoms with flexion of the head). These phenomena are of a reflex nature and are intimately connected with the pains arising from tension and irritation of the nerve roots. Besides this, the immediate irritation of the motor portion of the roots apparently plays a part in their origin. Belonging to the objective symptoms of sciatica, these phenomena allow one to differentiate organic disease from the functional pains and reflex neuroses sometimes following sciatica and also to recognize aggravation and simulation of the illness. Moreover, they should greatly aid one in determining the precise localization of the disease.

**TREATMENT**—The removal of foci of infection, and toxicity is stressed by F. Hiller (*Wien med. Wchnschr* 79 1255 (Sept 28) 1929). Various orthopedic procedures, such as manipulation of sacro-iliac joints, rest, immobilization and heat are advocated by the investigators who consider the bony changes of prime importance (*A. Feiling Brit M J* 1 386 (Mar 10) 1928), *W. Yeoman Lancet* 2 1119 (Dec 1) 1928, and others). In central sciaticas temporary relief is obtained by sacral epidural injections, as described by Norman Viner (*Arch Neurol and Psychiat* 20 336 (Aug) 1928), who uses from 50 to 100 c c ( $1\frac{1}{2}$  to  $3\frac{1}{2}$  ounces) of sterile Ringer's solution, physiological sodium chloride or liquid

petrolatum. He gives 3, or occasionally 4, of these injections at intervals of 1 week. Viner ascribes the improvement in these cases to the tension on the cauda equina produced by the injected fluid, an action analogous to nerve stretching. F. A. Chandler (*J A M A* 93 1447 (Nov 9) 1929) advocates spinal operation in the treatment of low back and sciatic pain. This procedure is applicable to developmental anomalies of the lumbosacral region and in pathologic conditions of the lumbar spine and sacro-iliac joints. Lange (*Vorschr d Therapie*, vol iv, 1928) injects isotonic salt solution in larger quantities under high pressure or sometimes epidurally through the sacral foramen, the latter in cases of suspected root sciatica. In his experience of 25 years, the percentage of cures is 75, of improvement 10, and failures 15.

R. F. Weiss (*Klin Wchnschr* 25 600 (Apr 12) 1929) points out that irradiation is only rarely employed in sciatica because the results have generally been unsatisfactory. He asserts that his technic of irradiation gave good results in many cases. The patients should be told that inflammation of the skin is necessary in order to effect intensive radiation. It is harmless and the itching will cease after application of soothing powders or ointments. The methods employed by the author are as follows. He divides the region of the sciatic nerve into 4 fields. Each of these areas is irradiated on 4 succeeding days for from 10 to 20 minutes at a distance of from 60 to 80 cm, with the surrounding skin covered. This treatment may be repeated several times. The author observed that the effects were not the

same in all patients. Some cases showed favorable results while others were not at all influenced. He states that quartz lamp irradiation is not indicated in cases in which the sciatica is a complication of some other disease, in sciatica with root symptoms or for neurotic patients. In other cases, however, it often gives good results when other therapeutic methods fail.

Valdivieso (Rev. med. d. Chile 56:133 (Feb.) 1928) reports a case of bilateral sciatica in which improvement was brought about by exposure to x-rays.

In 3 of 4 cases of sciatica reported by C. R. F. Beall (U. S. Vet. Bur. M. Bull. 4:848 (Oct.) 1928), administration of thyroid extract (6 to 10 grains—0.38 to 0.65 Gm. daily) was followed by improvement through relief from pain, reduction in the extent and degree of anesthesia, and gain in weight.

**SCLERA.**—S. P. Oast (Arch. Ophth. 57:254 (May) 1928) reports the occurrence of blue sclerotics and brittle bones. The syndrome of blue scleræ and brittle bones was first described in the early part of the nineteenth century. Since the beginning of the twentieth century, numerous articles have been written reporting its familial occurrence. Recently the observation has been made that the anomaly is very frequently accompanied by progressive deafness due to otosclerosis.

Despite a large amount of careful investigation, practically nothing has been learned regarding the etiology. The author accepts the theory ascribing the condition to mesodermal in-

feriority transmitted from one generation to another.

Oast reports the cases of a mother and son with azure blue scleræ. The son is free from other stigmata, but the mother exhibits a tendency toward brittleness of the bones. Neither the mother nor the son shows any indication of deafness. The author has been unable to determine in this case any familial history of similar anomalies. The son is the only child. The mother is myopic and the child hyperopic.

**SCLERODERMA.—SYMPTOMATOLOGY.**—There is a complex of symptoms in scleroderma, but there is at least 1 symptom in common, that is, the thickening and induration of the skin, but many of them are associated with prodromal manifestations that remind one of Raynaud's disease, or with abnormalities of pigmentation, sensory disturbances and general asthenia which may recall the later stages of Addison's disease. (Editorial in Lancet 214:458 (Mar. 3) 1928.)

**ETIOLOGY.**—W. T. Longcope (J. A. M. A. 90:1 (Jan. 7) 1928), of the Johns Hopkins University, has brought forward evidence which tends to show that the endocrine disturbance is more probably a secondary than a primary phenomenon in the evolution of the disease. The author's view is that the interstitial changes observed in the skin in every case are by no means confined to that organ, but can be demonstrated in the connective tissue and blood-vessels of the other organs.

John H. Stokes (J. A. M. A. 90:7 (Jan. 7) 1928) believes that scleroderma is not a disease but a symptom-

complex of considerable range. Identical pathologic changes underlie the localized forms, such as morphea, and there is even a related disease of the new-born.

S Petelin (Fortschr d Med 46: 789 (Aug 10) 1928) states that almost all authors suppose that the existence of scleroderma is related to disturbances of the vegetative nervous system and the endocrine apparatus. The author designates the vegetative nervous system as primary and the endocrine when present as secondary. Of the true causes of such disturbances in scleroderma we know almost nothing and we can only suppose that hereditary taints, inborn insufficiency and various sorts of trauma play rôles.

**TREATMENT** — Ewan Murray-Will (Brit J Dermat 39: 201 (May) 1927) cites a case of scleroderma in a woman 27 years old who had a positive Wassermann reaction and who made a marked improvement under antisyphilitic treatment when other treatments had failed to produce any permanent amelioration of symptoms. This instance would seem to make it more than probable that syphilis was the underlying cause.

A Devoto (Gior ital di dermat e sifil 69: 1070 (June) 1928) reports the use of **hypertonic alkaline solution** in the treatment of scleroderma. Out of 8 cases treated with 10 cc (2½ drams) of 10 per cent **sodium chloride** there was an appreciable improvement in 4 cases.

O Michaelis (Bruxelles méd 9: 560 (Mar 17) 1929) reports successfully treating scleroderma by a course of **insulin** in conjunction with **ultra-violet ray**.

**SCOLIOSIS.**—Scoliosis still continues to attract a great deal of attention in the literature. It is well recognized that there is no one method that will cure all cases, but fortunately methods have been devised that will arrest the progress of severe deformities and accompanying symptoms that were so long the *bele noir* of orthopedics. It is equally recognized that some cases are incurable from the time they are first observed, but that judicious care can alleviate the symptoms. Congenital deformities of the fifth or better the last lumbar vertebra, have long been recognized as existing with spinal curvatures and are believed to be a prominent etiologic factor.

**CONGENITAL** — B Blankoff (Arch franco-belges de chir 31: 225 (Mar) 1928) reports a case with premature sexual development and spina bifida occulta of the fifth lumbar vertebra.

An interesting statistical study is made by T A Tonina (Semana med 1: 689 (Mar 22) 1928) in which 1046 children were studied. Of 462 males, 6 to 12 years of age and 584 females, 6 to 13 years of age, 252 or 24 per cent were scoliotics, 94 males and 158 females. As *prophylactic* measures he attends to the shape of the bed, the posture, particularly when sitting, dress and sufficient rest. In the treatment he has found **exercises**, **heliotherapy**, **adequate diet** including **calcium** and **bismuth salts** to be beneficial.

**SCIATIC SCOLIOSIS** is defined by S Kleinberg (Am J Surg 7: 89 (July) 1929) as a deformity of the trunk resulting, usually, from a traumatic, sometimes a toxic, condition of the joints or soft tissues in the lower back, myositis or myofascitis.

of the gluteal region, or sciatica. Mild and moderate cases can be relieved by rest, support, external heat, massage, diathermy or the actual cautery.

In *chronic* cases one should stretch the back and affected limb under anesthesia, immobilize in plaster spica, advise rest in bed for 1 month, and then graduated exercises and physical therapy.

Basing his opinion upon the favorable results obtained in 6 cases, R. B. Osgood (J Bone and Joint Surg 9. 667 (Oct) 1927) believes that sciatic scoliosis results from the absorption of toxins from the large intestine in intestinal stasis. In the treatment he has found colonic irrigation, dietetic correction, exercises, Drown's method of abdominal massage and supports to correct ptosis as highly beneficial.

**COMPLICATIONS** —W Jaroschy (Beitr. klin Chir 142 597, 1928) reports 5 cases of *compression myelitis* secondary to pronounced scoliosis. They are more likely to follow congenital cases, but may occur in the rachitic variety. *Laminectomy* has demonstrated the absence of other compressive causes and has cured the condition. It is usually found in an old scoliosis in which there has been no recent change in the deformity. At about the second half of the second decade, symptoms of transverse lesion appear and in a few weeks high grade spastic paraplegia, sensory disturbances and rarely sphincteric phenomena appear. Myelography shows a complete and lasting stoppage of the fluid usually from the fourth to the seventh thoracic vertebræ. Stenosis of the spinal canal was observed.

**DIAGNOSIS.**—Martin (Weekly Roster and Medical Digest (July 28) 1928) advises care in the physical examination so that patients may be impressed with the gravity of the condition. All possible etiologic factors, particularly those extraneous to the spine, should be kept in mind.

**PROGNOSIS**—A definite and certain prognosis can be made if the body is radiographed in full extension, according to K Gaugele (Arch. f klin Chir 153 571 (Dec 23) 1928). The shape of the vertebræ is the main diagnostic criteria, the type of curve and rib deformity are secondary. If the spine can be straightened by extension the prognosis is good, if it cannot be straightened completely or if there is asymmetry of the ribs, the condition is apt to become worse unless proper treatment is instituted. Torsion of the vertebræ and contractions make for a bad prognosis, while fixed scolioses are hopeless, whereas in rachitis scoliotic deformities are absolutely preventable.

**TREATMENT**—C L Hawk (J Bone and Joint Surg 10 330 (Apr) 1928) bases his conclusions on the study of 2100 students in a college, in which 19 per cent showed mild scoliosis and were transferred to corrective classes for treatment by exercises.

E Gasne (Progres méd 44 583 (Apr 6) 1929) considers prescoliosis and 3 degrees of scoliosis and states that we know little about the intimate nature of scoliosis, although we surmise a close relationship to rickets. In the *prescoliosis* and the earlier stages of scoliosis he believes that irradiated food substances and calcium phosphate with exercises are valuable. He is skeptical as to the



value of retentive apparatus until the second stage is reached, in which permanent deformity is quite apparent. In the third stage, treatment is no longer of value, save a rigid corset which tends to arrest further progress.

**Exercises, bandaging, postural treatment, diet and good hygiene** is the regimen suggested by H. Scheuermann (*Ugeskrift for Læger* 90 399 (May 3) 1928) with the remark that only active gymnastic treatment is of lasting value.

An apparatus for continuous **extension** to correct spinal rotation, that will accomplish as much in 4 to 8 weeks as plaster treatment in 6 months, is described by C. L. Lowman (*J. Bone and Joint Surg.* 10 114 (Jan) 1928). When the maximum improvement has been obtained as shown by x-rays, **spinal fusion** is done. An ingenious apparatus for correction by means of plaster is described by R. Galeazzi (*ibid.* 11 81 (Jan) 1929). Of 82 cases treated by a **turnbuckle jacket**, excellent results were observed in 21, they were good in 23, fair in 17, poor in 8 and there was no correction in 13 cases. Double curves are not as amenable as single, and triple curves do not respond to treatment at all, according to A. H. Brewster (*Arch. Surg.* 18 1427 (Apr) 1929).

S. Kleinberg (*J. Bone and Joint Surg.* 11 66 (Jan) 1929) combines **fusion** with a large **beef bone** or **rib graft** on the concavity, preceding this by 4 to 8 weeks' recumbency on **convex frame with traction**. Six to 8 weeks after operation the patient is discharged in a plaster cast, this being changed every 2 months for 9 to 12 months, and then a celluloid

jacket is worn for 1 year. He states that while he has done 90, the operation is serious and difficult. In 91 per cent the deformity has been arrested and backaches have disappeared. In another report by the same author (*Am. J.* 6 803 (June) 1929), he refers to 54 cases similarly treated with good results.

A modification of **Hibbs operation**, combined with **Albee bone graft**, is reported by B. W. Moffat (*J. Bone and Joint Surg.* 10 316 (April) 1928). A. Whitman (*Am. J. Surg.* 6 801 (June) 1929) cites 15 cases in which he excised the prominent portions of the ribs and grafted them into the spine in combination with a **fusion operation**.

A rather bizarre method of operative correction is described by V. Chlumsky (*Med. Klin.* 24 1137 (Aug 31) 1928). A large transverse fold of skin is raised on the convexity and maintained by purse-string sutures buried in it to hold it in place. The fold remains for a few weeks and gradually thereafter disappears. During the existence of the fold the patient holds himself in a position that tends to correct the scoliosis. He claims that frequently the obliquity of the spine diminishes with surprising rapidity.

**SCURVY.** See DEFICIENCY DISEASES

**SEA-SICKNESS.**—With the recent increase in ocean travel, the medical staffs of the large steamship companies are giving serious attention to the problem of sea-sickness. One of the German lines has installed an apparatus for delivering **oxygen** under pressure, and its proponents claim that a daily inhalation of this gas will

reduce the incidence and severity of *mal-de-mer*. Nitrite therapy was introduced in 1928 and has received much favorable comment since, it rests on the observation that cardiovascular sedatives, like the nitrites, depress the functional activity of the labyrinth. D. B. Hayden and J. F. Percy (J. A. M. A. 90:1193 (Apr. 14) 1928) recommends the use of sodium nitrite, 5 grains (0.3 Gm.), every 2 hours, until relieved. A. Sellheim (Brit. M. J. 1:244 (Feb. 11) 1928) carries out nitrite therapy by giving a drop of 1 per cent solution of nitroglycerin, every 3 or 4 hours.

R. A. Bennet (Brit. M. J. 1:752 (May 5) 1928) observes that a passenger floating in a bath or swimming in the ship's pool does not feel nauseous, and suggests that this may be used in the management of seasickness. In spite of the movement of the ship, the water in the pool or tub remains in the same plane as the surface of the ocean, hence a patient immersed in it is not tossing with the vessel. Bennet also recommends warm water containing sodium bicarbonate after vomiting. R. H. Parmore (Brit. M. J. 1:959 (June 2) 1928) believes that acidosis is a factor and suggests the use of orange juice and other glucose preparations.

O. Bruns and E. Hornicke (Munchen med. Wchnschr. 75:167 (Jan. 27) 1928) places his faith in the barbitals, and believes that the patient should lie in a horizontal plane when he feels nauseous. A. Saha (Indian M. Gaz. 64:499 (Sept.) 1929) advocates strongly sedative combinations and offers a prescription containing cocaine, chloretone, and adrenalin. Of all these remedies, the nitrites have received the most attention, and

offer most promise for relief from the misery of sea-sickness.

### SEMINAL VESICULITIS.—

In a brief note on the ultimate results of the radical operation for tuberculosis of the seminal tract, H. H. Young reviews 22 cases which were treated by his radical operation. He urges the removal of the entire seminal tract, including the vas, the epididymis, the vesicle, and part of the prostate on both sides in all cases of tuberculous involvement of the genital tract.

In a discussion of posterior excision of the seminal vesicles, V. C. Hunt (Ann. Surg. 87:257 (Feb.) 1928) believes that the indications for seminal vesiculectomy should be restricted to cases of disease of the vesicles that are not amenable to medical treatment. The author describes the technic and concludes that when the indications for seminal vesiculectomy are clear and based on the definite pathological changes in the vesicles, the method described is not formidable, obviates the danger of injury to the anal sphincters, and facilitates visible extirpation of the vesicles.

Seventy-five cases of disease of the seminal vesicles, all of which were obstinate, are reported by T. Baker (J. Urol. 20:237 (Aug.) 1928) who tried vas injection for sterilization or disinfection, using the technic of Thomas, Belfield and others. He concludes that medication of the seminal vesicles by vas injection will effect a cure in 40 per cent of cases. Vas injection should be reserved for cases which have resisted other types of treatment for several months. He believes that the danger of sterility is

less when vas puncture is done than when vasotomy is performed

Internal medication with **arsphenamine** may decrease the number of operations performed for chronic *prostatovesiculitis* and its complications in the opinion of W T Belfield and H C Rolnick (J A M A 89 2104 (Dec 17) 1927) In 15 of 30 cases of non-tuberculous prostatovesiculitis which were refractory to the usual medical treatment, all evidence of infection promptly disappeared following a few injections of **nearsphenamine** or **sulpharsphenamine**.

**SEPTICEMIA.—ETIOLOGY**—*Bacillus supestifer* may produce febrile conditions simulating typhoid, according to J T Bauer and M McClintock (J Infect Dis 44 292 (Apr) 1929) It should be considered when organisms of the paratyphoid group are isolated from the blood and all agglutinations with stock strains of *B typhosus* and *B paratyphosus* A and B fail

E H Mason and W W Beattie (Arch Int Med 42 331 (Sept) 1928) report a case of septicemia, due to a member of the *B Mucosus-capsulatus* group giving a positive Voges—Proskauer reaction The infection ran a rapid, septic course, terminating fatally without localization The portal of entry was not determined

**DIAGNOSIS**—L Bordin and Reyt (Bull et mém Soc méd d hosp de Paris 52 1328 (July 26) 1928) were able to obtain a positive blood culture and a bile culture in a case of pseudo-rheumatic infection with a polymorphous erythema

A clinical classification of septicemic states is given by L Langeron (J de méd et chir prat 99 130 (Feb 25) 1928) as follows

(1) Those cases in which the organism gives rise to the typhoid state

(2) The septicemia is the sequel of an obvious local sepsis such as puerperal fever

(3) In this class there is a dominant symptom or group of symptoms, which suggest a particular organism, as phlebitis causing a streptococcal septicemia, or osteomyelitis a staphylococcal one

(4) This group comprises cases in which the septicemia has no obvious or definite characteristics, the causal agent can be suspected though not definitely established

W Uffenorde (Deut med Wchschr 55 775 (May 10) 1929) believes that patients with infected tonsils, in whom phlegmons and abscesses persist, and those who have attacks of chills and continued high temperatures, should be carefully watched for the development of sepsis

**TREATMENT**—S H Zia, R H P Sia and S T Woo (Nat M J China 15 117 (Apr) 1929) studied 94 septicemic cases, some of which had intravenous administration of **mercurochrome-220** and some had other intravenous therapy They believe mercurochrome had no particular value in the treatment

I Cohn (New Orleans M and S J 80 84 (Aug) 1927) states there is experimental proof that the maximal concentration of chemical substances advisable to introduce into the circulation has no bactericidal action The so-called specific action of the various dye-stuffs, presupposes a selective bacteriotropic action and a negative organotropic action Dale contends we have no reason to believe such selectivity exists The drug in-

jected has a stimulating effect on the body cells. The bacteria soon disappear from the blood stream and settle in the spleen, liver, bone marrow and lymph nodes. Positive blood cultures signify only that the organisms are being transported by the blood stream. Multiplication takes place in the foci where the organisms settle. **Blood transfusion** stimulates the reticuloendothelial system whose function is phagocytic.

In 12 cases of general sepsis of otitic origin, H I Lillie (Arch Otolaryng 7 3 (Jan) 1928) used **blood transfusion** with and without the intravenous injection of a **germicidal dye**. The germicidal dye must be properly prepared and administered with the aid of an expert hematologist or biochemist.

F T Cadham (Canad M A J 19 54 (July) 1928) treated 18 septicemic patients by repeated inoculations of a **homologous immune animal serum** and with repeated transfusion of **human serum**. Sixteen cases recovered.

**DIPHTHERITIC**—A Elkeles (Med Klin 25 674 (Apr 26) 1929) found diphtheria bacilli in the organs of patients with diphtheria in 33 of 64 postmortems. The bacilli enter the blood stream either just before or immediately after death. This assumption is based on observations in 2 cases in which a heart puncture made just before death revealed sterile blood, whereas at necropsy, 24 hours later, bacilli could be found. Of 187 patients with diphtheria Roedelius found only 3 with bacilli in the blood stream. At postmortem, performed 24 hours after death, bacilli could be cultivated from the blood of the heart, liver, spleen and kidney.

**MENINGOCOCCIC**—L C Montgomery (Canad M A J. 20 266 (Mar) 1929) had a case of chronic meningococcic septicemia which persisted for 6 months without going on to meningitis. It responded to intravenous intramuscular and subcutaneous administrations of **polyvalent antimeningococcus serum**. A concomitant intense cellulitis played the part of a fixation abscess, or shock therapy.

**DIAGNOSIS**—According to Mahieu (Thèse de Paris, 16, 1928), meningococcal septicemia is easily diagnosed by a triad consisting of fever, often of an intermittent type, eruptions, the commonest of which resemble erythema nodosum but which may be also morbilliform or scarlatiniform, and arthralgia and myalgia. The blood culture is often negative. **Antimeningococcal serum** should be given intravenously, intramuscularly, subcutaneously and intraspinally. In refractory cases fixation abscesses or shock therapy should be employed.

**PATHOLOGY**—R Middleton and W Duane, Jr (Am J M Sc 177 648 (May) 1929) report a case in which the patient died in 15½ hours after the onset of the illness. At necropsy a bilateral hemorrhagic destruction of the suprarenal was discovered, which accounted for the low blood sugar value and marked hypotension. The total absence of suprarenal secretion, with resulting failure of carbohydrate mobilization and vasomotor control, may have been the immediate cause of death. Meningitis was absent. Two forms of purely septic meningococcus infection are defined.

(1) There is a prolonged febrile state, characterized frequently by

arthritic symptoms and a mild roseolar or petechial eruption. Prostration is often not severe and this form may resemble typhoid fever or malaria.

(2) This form includes fulminating cases with wide-spread purpuric blotches. In these patients death may occur very rapidly, as early as 4 hours after the onset of the symptoms. The authors believe that meningococcal meningitis is frequently preceded by meningococcal bacteriemia and that intravenous therapy should be used vigorously.

**PNEUMOBACILLAR**—M Faure-Beaulieu and G Desbucquois (Bull et mém Soc méd d hôp de Paris 52 1083 (June 28) 1928) report a case of pneumobacillar septicemia with an atypical meningeal reaction. The patient had a peribuccal herpes which was considered the focus. Signs of meningeal irritation appeared and lumbar puncture revealed hemopurulent spinal fluid which contained pneumobacilli.

**PNEUMOCOCCIC**—J Hutinel, L Aourousseau and Cofine (Bull Soc de pédiat de Paris 25 481 (Dec 20) 1927) had a case of pneumococcic septicemia which showed a positive blood culture. It was manifested by a typhoid state infection of the peritoneum and multiple abscesses.

**STAPHYLOCOCCIC**—E F Wahl (J Nerv and Ment Dis 67 351 (Apr) 1928) reports a case in which there was secondary involvement of the spinal cord, brain and meninges. The plastic smile, the emotional instability, the waxy rigidity of the arms, the tremor of the head, arms and tongue, and the purposeless movements of the arms and hands, are evidence of localized involvements of the basal ganglia.

J P. Bowler and J J. Boardman (New England J Med. 200:327 (Feb. 14) 1929) saw a 13 year old girl who developed staphylococcic septicemia 4 days after an abrasion of the knee. Five days after the onset of the condition the blood cultures were positive and there was evidence of osteomyelitis of the clavicle. In early cases of multiple foci of osteomyelitis the diagnostic use of x-rays is useless, for the time at which drainage should be instituted has passed when changes have developed.

**TREATMENT**—1 Administration of mercurochrome.

2 Injections of serum from donors immunized against staphylococcus vaccine.

3 Staphylococcic antitoxin of Parker.

4 Immobilization in the position of rest with the use of sandbags and pillows and measures to prevent deformity.

5 Operations for sequestra.

E Moos (Med Klin 24 1507 (Sept 28) 1928) obtained good results in 13 cases of staphylococcus sepsis with 5 per cent collargol solution given as enemas in 25 to 100 c c (3<sup>1</sup>/<sub>2</sub> ounces) quantities.

**STREPTOCOCCIC**—Fonteyne, Millet and R Verhoogen (J de méd de Paris, p 572 (July 4) 1929) believe a blood culture should be taken from the superior longitudinal sinus through the anterior fontanelle of infants. They report 2 fatal cases. The first, was a female infant, aged 5 months, who developed a streptococcal infection of a septico-pyemic type which lasted for 3 months. During this period, numerous streptococcal foci appeared, first in the cervical lymphatic glands, then in the skin.

and subcutaneous tissue, and lastly, in the form of broncho-pneumonia, pulmonary abscesses and ulcerative endocarditis. The second case was a male infant, aged 4 weeks, in whom the disease lasted only 6 days, and was characterized by streptococcic infection of the skin, subcutaneous tissue, lungs and meninges.

G Bernard (*Gynec et Obst* 17 - 216 (Mar) 1928) treated 35 cases of generalized puerperal infection with **antistreptococcus serum**. The incidence of recovery was 47.3 per cent. In 20 per cent of the cases it acted quickly, lowering the temperature and improving the general condition. It appears to supply the organism with antibodies corresponding to the strains of streptococci causing the infection. In some cases it seemed to act indirectly by increasing the resistance of the body and stimulating its defensive forces. The serum should be given in large doses from 80 to 100 c.c., intramuscularly, daily. As it acts slowly, its effect cannot be judged before 2 or 3 days. If there is no improvement in 5 or 6 days, the serum is not effective and an intravenous injection of **colloidal metals** or a **shock treatment** by the intravenous injection of **peptone** should be tried.

P Hebert (*Bull et mem Soc med d hop de Paris* 52 1354 (July 26) 1928) describes a case of streptococcic septicemia which was cured by 8 **immuno-transfusions** of 200 c.c., each preceded by an injection of the **vaccine** into the donor.

**SHOCK.—ETIOLOGY.**—In discussing shock from the standpoint of the peripheral vasomotor mechanism, J J R Macleod (*Phys and Biochem*

*in Mod Med* 1926, J A M A 92 987 (Mar 23) 1929) maintains that it may be due to a variety of causes. He described it, in a general way, as a condition wherein there is more or less paralysis of the sensory and motor parts of the reflex arc, along with profound disturbances in the circulatory system, subnormal temperature, and frequent and shallow respiration. The early belief that shock is an expression of the exhaustion of the vasomotor center is not supported by actual investigation. Consequently attention has been directed to peripheral, rather than central, mechanisms concerned with the maintenance of blood-pressure. It has been suggested that the natural tendency of the capillaries is to become dilated, the circulation of hormones in the blood ordinarily serving to maintain the tonus of the vessels and to preserve adequate arterial pressure.

Meltzer conceived of the existence of antagonistic impulses, respectively augmentative and inhibitory in nature, playing on a peripheral vasomotor mechanism. He concluded that the injuries capable of bringing on shock do so by favoring the development of the inhibitory side of the body functions. It would seem as if the change from a pressor reaction in the normal to a depressor one in the shocked animal on certain afferent stimuli might be another manifestation of the increasingly preponderating inhibitory reactions over the augmentor.

Support for the inhibition hypothesis of shock has been furnished by M I Smith (*J Pharmacol and Exper Therap* 34 239 (Nov) 1928). His experiments on animals indicate that the production of experimental shock by means of drugs, as ergota-

mine, intestinal trauma or hemorrhage is associated with harm to the sympathetic vasoconstrictor mechanism. This means that shock producing agencies give rise to a progressive depression of the peripheral vasomotor mechanism. The difference in degree of relative susceptibility of the augmentor and inhibitory fibers to injury accounts for the depressor vascular responses of shock superseding the normal pressor reactions to certain afferent stimuli. The possibility of an exhaustion of a peripheral vasomotor mechanism helps one to understand why, in profound shock, the reaction to epinephrine may be slight, while the response to pituitary extracts acting directly on smooth muscle is still satisfactory.

**TREATMENT**—Evidence has accumulated, following investigations during the War, to show that one of the important factors in the production of traumatic shock is the absorption of a toxin developed in the injured tissue. The nature of this toxin is unknown, and although conditions simulating shock have been said to be produced by protein cleavage products, as histamin, convincing proof of this theory is wanting.

D Fisher and E H Mensing (Surg Gynec Obst 40 548 (Apr) 1925) advocate the use of glucose intravenously with insulin subcutaneously in the treatment of shock. In 1925, he reported 5 cases of post-operative shock successfully treated in this manner with results which seemed more rapid and certain than had been his experience with glucose or saline alone. W Thalheimer (J A M A 81 383 (Aug 4) 1923) had first successfully treated a case of *post-operative acidosis* by the use of glucose and

insulin with immediate cessation of symptoms. D Fisher and M W Snell (J A M A 82 699 (Mar 1) 1924) later reported cases of *pre-operative acidosis* treated in this manner with equal success. The similarity in many respects of some of the symptoms of these cases with those of shock led Fisher to institute the glucose insulin treatment in *post-operative shock*. In 1926, D Fisher (Surg Gynec Obst 43 224 (Aug) 1926) reported 3 cases treated by this method with special emphasis on the results obtained in surgical shock. G Ginsburg (J A M A 82 1517 (May 10) 1924) reported 1 case of traumatic shock treated successfully in this manner.

The rationale of this method depends upon the fact that in cases of shock, regardless of the cause or exciting factor, the symptoms are essentially always the same, indicating an exhaustion of all body processes. The metabolism is low. The tissues are in serious need of energy and the failing circulation may finally lead to complete exhaustion and death. Glucose solution injected directly into the blood stream will add to the decreased blood volume and raise the blood-pressure temporarily but, because of the diminished cellular activity, the body may not be able to oxidize the glucose. M Ringer (J Biol Chem 58 483 (Dec) 1923) has shown that insulin will oxidize glucose. Hence, the addition of insulin assures the rapid oxidation of the available glucose, thus supplying the tissues with the energy so sorely needed. Where the shock is not severe, the body can utilize the glucose without the aid of insulin. The most striking results of this treat-

ment are seen in the severe cases. The improvement is more rapid than would be expected with glucose alone, apparently due to the administration of insulin.

**TECHNIC**—The shocked patient is immediately given 1000 c c (1 quart) of a 5 per cent or 10 per cent glucose intravenously. The infusion is allowed to enter the vein slowly, so that the whole amount is administered over a period of 1 hour. The solution is kept at the required temperature ( $100^{\circ}\text{F}$ — $43.3^{\circ}\text{C}$ ) throughout the infusion and the patient is watched for reaction of any kind. Insulin is given subcutaneously at the rate of 1 unit (V/20) to 3 Gm (45 grains) of glucose. The total amount of insulin is given in 2 equally divided doses, one, 10 minutes after the beginning of the infusion and the second, 5 minutes before the end of the treatment. Clinical improvement is usually noted during administration of the solution. The pulse and blood-pressure are recorded at the beginning and at the end of the infusion.

No ill effects from the use of insulin have been experienced in these series. In patients suffering from severe acute infections, it is necessary to give larger doses of insulin, 1 unit of insulin for every 2 Gm (30 grains) of glucose.

The present series comprises 65 cases. Forty-three per cent of the cases were traumatic shock and some did not require operative treatment. Many were treated for shock before the operation and some needed shock treatment during the operative procedure. Thirty per cent were cases of post-operative shock necessitating treatment in the first 24 hours following operation. This group includes

traumatic cases in which shock did not appear until after operation and other cases in which hemorrhage, prolonged anesthesia or operative procedure were combined in causing the resultant shock. The remaining 27 per cent were cases we have chosen to call antemortem shock. These include those cases in *extremis*, evidently dying of a hopeless condition. In all these cases the other usual measures to combat shock were used, opiates, external heat, shock position and operative treatment of damaged tissue were all employed as indicated.

Summary 1. The value of any intravenous therapy in the treatment of shock rests, for the most part, on the replacement of lost blood volume.

2. Glucose intravenously with insulin subcutaneously in the treatment of shock gives results which, in this series, seem more satisfactory than those obtained in cases treated by saline or glucose alone.

3. Cases of traumatic shock respond most readily to this treatment.

4. Cases of post-operative shock treated in this manner show marked improvement.

5. The optional dosage is 1000 c c (1 quart) of a 5 per cent or 10 per cent solution of glucose with 1 unit (V/20) of insulin to 3 Gm (45 grains) of glucose. Beneficial results are usually apparent after 800 c c of fluid have been injected.

6. Cases in which shock appears immediately after the injury, may develop a secondary shock, as severe as the primary condition, several hours later.

7. Cases of shock in which the blood-pressure is decreasing toward the critical level (80 mm. to 90 mm.) should be treated immediately, before



the sudden fall which often follows, with symptoms of severe shock

E C Padgett and T G Orr (Surg Gynec Obst 46 783 (June) 1928) state that experimentally the **dextrose-insulin** treatment of shock seems to be no more beneficial than treatment with a **hypertonic solution of dextrose or sodium chloride**

### SINUSES.—INFLAMMATION

—L W Dean (J A M A. 93 838 (Sept 14) 1929) states that sinus disease in young children assumes increased significance each year. It is not unusual to have a child suffering from asthma or arthritis with chronic nasal sinusitis improve very much with the apparent healing of a chronic sinusitis. The attacks of asthma may cease or the acute manifestations of the joint lesion disappear. He further states that it is usual for the child to return after a few months or years with a history of a head cold followed by the return of the systemic disturbances. Treatment of the sinus again produces the desired result. The return of the trouble is due to the fact that the *chronic sinusitis* has not been completely eradicated.

Chronic nasal sinusitis in children may serve as a source of infection of the ocular apparatus, it may serve as a focus of infection for joint or kidney, as in the adult.

**ETIOLOGY**—The etiologic factors of *chronic* sinus infections in children are numerous and complicated. Dean (*ibid*) states that one must consider Deficient diet, poor hygiene, including improper clothing and ventilation, allergy, metabolic disturbances, climatic conditions, especially lack of sunlight and dampness, swimming, endocrine disturbances, nephrosis,

diseased tonsils and adenoids, **nasal blockage** and infection, especially in contagious diseases.

J J Shea (Ann Otol Rhin and Laryng 36 991 (Dec) 1927) calls attention to an inherited weakness toward *paranasal sinusitis*. This inheritance may be either direct or crossed, the latter being the commoner. The sinuses of the child simulate those of the parent or immediate antecedent whom it resembles in facial appearance. The writer has observed that children who have had their tonsils and adenoids removed at an early age are more susceptible to sinus disease than those who have retained theirs until puberty.

**COMPLICATIONS**—Among the serious complications of sinusitis are *meningitis* and *cavernous sinus thrombosis*. H C Todd (J Oklahoma M. A 21 286 (Oct) 1928) reports a case of aseptic cavernous sinus thrombosis complicating a low grade infection of the left sphenoidal sinus, with recovery. The diagnosis was based on (1) The history of rapidly developing exophthalmos, more marked on the left side, which was associated with redness, engorgement and chemosis, (2) increased intracranial tension, as shown by a slow full pulse and marked engorgement of the veins in both fundi, (3) total absence of fever and other signs of sepsis.

Though this condition tends to become cured spontaneously, in the case reported a **subtemporal decompression** was done to decrease the danger of blindness from intracranial pressure on the optic nerve. The operation was followed by complete recovery with no impairment of vision.

E P Fowler (Arch Otolaryng.

9 159 (Feb ) 1929) presents the results of an exhaustive investigation relative to the incidence of *paranasal sinusitis* and *aural disease* occurring in 100 consecutive cases in children. Fifty-seven per cent of the cases showed moderate or severe involvement of the nasal sinus spaces, 71 per cent exhibited pathologic changes in the ethmoid septa, 86 per cent revealed pathologic processes in the sinuses. The chronicity or the supuration in the ear was directly proportional to that in the ethmoidal septa. In virtually all of the children there had been inflammation not only of the ears, but also of the nasal sinuses. The coexistence of otitis and active or latent sinus infection is not coincidental.

**DIAGNOSIS**—*Iodized oil* has found a definite place in the diagnosis of sinus disease, especially the *maxillary sinuses*. H C Anderson (Arch Otolaryng 7 340, 1928) introduces 3 to 5 cc of iodized oil into the sinus with a syringe after a preliminary lavage with sterile water. The examination is then made by means of the fluoroscope or film. When the mucous membrane is uniformly swollen, as in acute sinusitis, the oil collects in a small pyramidal mass in the center of the sinus, with a narrow extension reaching medially and upward toward the ostium. This mass is stationary when the head is moved. Thickening of the mucoperiosteum is determined by comparing the bony margin with the oil margin. Polypi or abscesses within the mucous membrane are shown by filling defects.

G Fetterolf and E E Sprenkel (Arch Otolaryng 9 181 (Feb ) 1929) found that the *frontal sinuses* were

decidedly smaller than they appeared to be on transillumination, the x-ray films showing their upper margins to be from  $\frac{1}{2}$  to  $\frac{3}{4}$  inch lower than the impressions conveyed by transmitted light.

**TREATMENT**—The treatment of *acute sinusitis* is medical. It consists in the use of *astringents* in the nose, *mild suction*, and sometimes in the subacute stage, *irrigation* of the sinus with physiologic solution of *sodium chloride*.

In *chronic sinusitis* conservative measures should first be used in the attempt to establish ventilation and drainage. In the *hyperplastic* types of sinus disease with polyp, and in the resistant *chronic suppurative inflammations*, the operation most suitable for the particular case is resorted to.

**BRONCHOSINUSITIS** as a clinical entity has been discussed at length by W W Wasson (J A M A 93 2018 (Dec 28) 1929). He states that in an infection of any portion of the respiratory tract, this tract should be considered in its entirety. Any acute or chronic infection is quite likely to involve more or less the entire tract. He draws his conclusions primarily from observations in a series of 90 children who have been studied from birth to 8 years of age. Certain infections of the respiratory tract have been observed to develop during these 8 years into typical bronchosinusitis disease, both clinically and roentgenographically. Several hundred of other cases have been studied in clinic and private practice. The author found that a certain number of those infants with mucus in the pharynx and trachea immediately after birth do not entirely get rid of

this mucus. A few weeks or months later they develop symptoms of thymic stridor. This stridor, the author found to be due to infections of the sinuses, bronchi and more or less the entire respiratory tract. Some of this group get well spontaneously when they gain their respiratory reflexes at from 9 to 12 months of age. Others have frequent attacks of respiratory infections and the common cold and develop frank sinusitis, bronchitis, or asthma at from  $1\frac{1}{4}$  to 3 years of age. The author emphasized that not every case of sinusitis, tonsillitis, or respiratory infection develops into the typical bronchosinusitis disease in either its acute or its chronic form.

**TUBERCULOSIS**—F. L. Lederer and G. S. Livingston (*Ann Otol Rhin and Laryng* 37:1176 (Dec) 1928) report a case of tuberculosis of the nasal accessory sinuses arising primarily as a tuberculous osteitis of the cranial bones. The patient had complained for a number of years of frontal headaches accompanied by vertigo and nausea. Eventually the condition caused epistaxis, and swelling of the eyelids followed by blindness. The ocular fundi showed moderate optic neuritis at operation, the ethmoid and sphenoid were exenterated and tuberculous granulation tissue with typical tubercles and giant cells was removed. Recovery was good and vision began to return in 1 eye, but the patient left the hospital against orders and returned about 5 months later with a fatal tuberculous meningitis.

**SKIN.—CHEMISTRY OF — MINERAL CONTENT**—Nathan and Stern (*Dermat Ztschr* 53:451 (July)

1928) found in freshly excised pieces of normal human skin that the potassium content is about 200 to 300 mgm per cent and the calcium content between 20 and 30 mgm per cent, reckoned upon the net weight of the skin. The water content of fresh normal skin is between 65.9 and 70.6 per cent. The calcium content of the skin increases with age.

**SUGAR CONTENT**—Urbach and Sicher (*Wiener klin Wchnschr* 41:1481 (Oct 25) 1928) found that the sugar content of the skin is approximately the same for animals of the same species but varies widely for different species of animals. For man and for the mouse it is about half as much as the sugar content of the blood. In normal persons, ingestion of 100 Gm of dextrose raises the sugar content of the skin 100 per cent—the maximum being reached after one hour. It returns to normal one hour later than the blood sugar, but it never requires more than four hours.

**SKIN GRAFTING.** See PLASTIC SURGERY.

**SMALLPOX (VARIOLA).—MORBIDITY**—The incidence of smallpox in the United States is still very high. S. B. Woodward (*New England J Med* 200:304 (Feb 7) 1929) quoted statistics for the 10 years between 1913 and 1923 when 579,618 cases of smallpox were reported. He urged more rigorous rules regarding vaccination among the private schools of his state of Massachusetts and hoped that eventually that there would be a state law that would require every child to be vaccinated at the age of 1 year and at suitable intervals thereafter.

In England also there has been an increase in the incidence of the disease. In 1926 smallpox was reported 10,141 times and in 1927, 14,787, while in Prussia there were but 3 instances in 1927 and 2 in 1928. (J A M A 92 1616 (May 11) 1929, Berlin correspondence) The disease has been mild in England with the exception of a small outbreak on a steamship arriving from Bombay, India, which spread to 51 passengers who had been exposed. Ten deaths resulted. The English minister of health reported that this special epidemic had been checked and that the remainder of smallpox cases occurring in England represented the average number which are present endemically each year. (J A M A 92 2181 (June 29) 1929, London correspondence)

**DIAGNOSIS**—Frequently, as described by an editorial (Internat Digest (Feb) p 127, 1930), the diagnosis of mild cases of smallpox is extremely difficult. For this reason a laboratory test for the purpose has always been deemed desirable.

In 1925, M. H. Gordon demonstrated that the virus of smallpox gave both specific complement fixation and flocculation with an anti-variola serum. His evidence was very convincing and recently, in the Lancet, Burgess, Craigie and Tulloch have taken advantage of it.

From the suspected case, a suspension of the crusts of the lesions are mixed with a specific flocculation serum prepared in a rabbit. Material was obtained from 93 cases, of which 53 were, with one exception, of the mild type. Numerous ones presented real difficulty for clinical diagnosis. The remaining 40 constituted the control series, consisting of 11 cases of

vaccinia (bovine 4, rabbit 5, human 2), 27 cases of chickenpox, 1 case of impetigo, and 1 case of septic rash. The results of the flocculation test were compared with the clinical and epidemiological evidence and the authors concluded that the reaction is specific and of diagnostic value.

Other investigators have been unable to agree with the author, claiming the complement and agglutination reactions are the result of contaminating bacteria present in the virus suspensions. However, Burgess, Craigie and Tulloch have done control experiments with sera prepared against the bacteria found as contaminants, and their results do not support the contentions of the objectors.

To diagnose smallpox, an intradermal test with a saline suspension of the pustules or scabs has been employed by R. D. Defries and N. E. McKinnon (Am J Hyg 8 107 (Jan) 1928). They injected the material into the skin of normal rabbits and vaccine-immunized rabbits. The reaction in the former had a definite size and character which differed from that produced in the immune animal. Such lesions were not produced by chickenpox. They believed that this method was superior to the inoculation of the cornea of rabbits which had been advocated previously as a means of identification of smallpox.

A test for immunity to smallpox recommended by S. B. Hooker (J Infect Dis 45 255 (Oct) 1929) consisted of an injection of heat-killed vaccine virus into the skin of the person to be tested. Immune persons had a positive reaction of localized redness and edema, most marked

at the end of 36 to 48 hours, while those who were susceptible usually had no reaction. The positive tests were occasionally hard to interpret but the negative reactions were reliable indications of lack of immunity.

#### METHODS OF VACCINATION.

—J. A. Toomey and R. B. Hauver (Am J Dis Child 35 186 (Feb) 1928) advocated the intradermal injection of a diluted vaccine material for the purpose of vaccination against smallpox. They claimed that this method had the following advantages over other procedures: (1) there was less pain from the 1 intracutaneous injection than from multiple skin punctures or a continuous scratch, (2) a definite amount of material was injected; (3) it was more adaptable for patients with skin eruptions, (4) no bandage was necessary, (5) a "take" was more certain, (6) there was a saving of time and (7) any antiseptic solution could be used for the cleansing of the skin in preparation for the injection without affecting the virus.

Objections to the method have been raised by C. Armstrong (J A M A 91 1530 (Nov 17) 1928) who answered the above arguments by claiming that the distention of the tissues by the intradermal injection caused considerable pain, that the vaccine material was not always sterile, and that the use of a bandage is not necessary in the cutaneous methods of vaccination. He believed that such a method of vaccination as the multiple puncture procedure should not be discarded at once for a method like the intradermal one which is yet new and unproved.

R. D. Defries and N. E. McKinnon (Canad M A J 19 525 (Nov) 1928)

report the value of the glycerinated vaccine which is free from contaminating bacteria and is available to all physicians.

Its preparation is briefly the following. Healthy calves are observed for a period of 8 days before the vaccination. At the end of this time, light scratches, not enough to draw the blood, are made over the entire abdomen and the inner surface of the thighs. The vaccine virus is then applied and rubbed into the scratches by using a smooth instrument such as a spatula.

The pulp is removed by a spoon curette and a post-mortem examination of the calf is made to determine the presence of any disease. If it be found, the pulp is discarded. The pulp is then emulsified by grinding it with a 50 per cent solution of sterile glycerine containing a 0.5 per cent phenol, in the proportion of 1 part of pulp to 4 parts of glycerin-phenol solution. This glycerinated vaccine is kept at 0° C for from 1 to 4 months. Periodically a sample of this vaccine is examined for its potency by vaccinating rabbits and observing the reaction.

For vaccinating children the best time is the first year of life when the reaction is slightest. It is possible to keep the site clean and dry in the young infant with little trouble. It is, of course, unwise to vaccinate any child or adult who shows fever or any other symptoms of illness.

Various estimates have been made as to the duration of immunity, but the frequently quoted period of 7 years must be considered only as an average.

Two methods of vaccination are now in vogue, the short scratch and

the puncture method. The former is done as follows. After thorough cleansing of the site with soap, water and alcohol, 3 short scratches are made, about one-sixteenth to one-eighth of an inch long, with a sterile needle and one and one-half inches apart. The virus is gently rubbed into 2 of the scratch marks and the remaining one is left free as a control.

By the puncture method the site is cleansed, as previously described, and with the sterile needle held parallel to the arm, the point is pushed into the skin for a distance of one-sixteenth of an inch. This is the control puncture. On 2 other points on the arm, a drop of virus is placed and, with the needle in the same position, a puncture wound is made into the skin carrying the virus with it.

Some men have found it advisable to combine both methods on the same arm. After-care consists of keeping the area clean and dry, without any interference with the circulation or with the normal evaporation from the area. Anything in the form of a dressing which interferes with the above will produce a condition favorable to a secondary infection.

Should the lesion rupture and serum exude, sterile gauze should be applied with proper precautions. If fever, headache, malaise and other symptoms develop, complete rest in bed is indicated.

In addition to the common "take" seen by every observer, there is the immediate reaction and the accelerated reaction. The former is apparently an expression of immunity, as it is seen in those individuals who have been successfully vaccinated or have had smallpox. It is characterized by the formation within 24

hours of a definite red papule which reaches its full development within 72 hours and rapidly retrogresses without going on to the stage of vesiculation or pustulation. The latter, the accelerated reaction, is seen in those individuals who have a mild immunity or have a partial immunity from a previous attack of smallpox. Before the fourth day, a papule develops which passes through the vesicle, pustule and crust stages, occasionally resulting in a small scar. There are innumerable gradations between the accelerated reaction and the true "take."

For the reason of the development of various types of reactions, it is advisable to observe every vaccination about the second or third day, and at the sixth day, when the presence of an accelerated reaction or a typical "take" may be seen.

**COMPLICATIONS**—The most common complication is *secondary infection* and the most serious of these is with the *tetanus* organism. Charles Armstrong reports (Pub Health Rep 42 3061 (Dec 16) 1927) that (1) Without exception, the lesions observed were covered during all their active course by some sort of shield or dressing strapped to the vaccinated area, (2) the cases in the great majority were vaccinated by a large insertion one-quarter to five-eighths of an inch in diameter, (3) the cases of post-vaccinal tetanus for which the data are available have without exception followed primary "takes."

Experimental work carried on by the author revealed that in monkeys the vaccinations which were covered showed a tetanus rate of 73.3 per cent, in rabbits, 80 per cent of all

those on which dressing were used developed tetanus. Of a series of 98 patients observed by the writer who developed tetanus following vaccination, all had had some sort of dressing applied to the site of inoculation, in the form of a shield, gauze or pad. Those whose vaccinations were uncovered did not develop tetanus. In a group of animals, tetanus bacilli were inoculated into the wound with the vaccine virus, and some were covered with dressings and others were left open to the air. The former group developed tetanus much more readily.

Secondary infections by the common pyogenic organisms are less serious in nature but of course should be guarded against by the proper procedure, and technic omitting any dressings or gauze which will inhibit the drying of the scarified area and allow the growth of an organism.

**POST-VACCINAL ENCEPHALITIS**—The number of reports of post-vaccinal encephalitis have been increasing during the past few years. According to S. P. Bedson (*Lancet* 2 920 (Nov. 2) 1929), the first instance was recognized in London in 1912. Between the years 1922 and 1927, 93 such complications occurred, which was equivalent to 1 for every 48,823 vaccinations. Among this group of 93, 66.6 per cent were children between the ages of 5 and 14 years. The symptoms which occurred most frequently were headache, vomiting and drowsiness, beginning 9 to 12 days after vaccination, and later, coma and signs of localized central nervous lesions. About one-half of the patients died. The causes of the encephalitis that have been suggested are (1) a direct action of the vaccine virus, (2) the activation

by the vaccine material of some "neurotropic virus" already present in the patient and (3) a toxic effect of the vaccine virus.

The pathologic changes occurring in post-vaccinal encephalitis have been described by H. M. Turnbull (*Brit. M. J.* 2 331 (Aug. 25) 1928) and J. McIntosh (*ibid.* 2 334 (Aug. 25) 1928). The lesions were widespread throughout the brain and cord and consisted, in part, of congestion and of infiltration of endothelial cells and giant cells in areas near blood-vessels. There was a demyelination and softening of numerous nerve fibers. McIntosh described the histologic changes in the tissues of a patient who died of encephalitis following smallpox and found them similar to those produced by inoculation of rabbits with vaccine. He was able to produce encephalitis in animals by intracerebral injections of certain strains of vaccinal virus, and visceral lesions by intravenous injections of the material. Grossly, the visceral lesions had the appearance of miliary tubercles but histologically they were associated with a larger amount of fibrous tissue than were tubercles. In a later report, J. McIntosh and R. W. Scarff (*J. Path. and Bact.* 32 551 (July) 1929) observed that intravenous injection of the vaccine virus into rabbits caused a rise in fever in the animals on about the fourth day, which reached a maximum on the sixth to eighth day. The lesions occurred on the skin, the mucous membranes, lungs, liver, spleen and brain, and their contents were sterile.

S. R. Douglas, W. Smith and L. R. W. Price (*J. Path. and Bact.* 32 99 (Jan.) 1929) had reported similar re-

sults previously and found that in fatal cases, the material in the lesions became contaminated with virulent streptococci and they suggested that this condition may account for the severer smallpox infections in man. All strains of vaccine virus did not produce lesions with the same distribution. Virus that had been activated by passage through the brain of animals selected the nervous system, while that which had been activated by passage through testes had a predilection for the peritoneum and the bladder.

The animals that recovered from such injections had certain antibodies in their blood, according to C. H. Andrewes (J. Path. and Bact. 32: 265 (Apr.) 1929). He collected and filtered the blood of rabbits 14 days after the vaccine virus had been injected. If this serum was given at the same time or before an inoculation with vaccine virus, the animal was protected from the disease. He claimed that 55 per cent of the treated animals developed an active immunity from this serum.

Several writers have suggested that the incidence of post-vaccinal encephalitis is due to the incorporation of an encephalitis virus with the cow-pox lymph. The cow-pox virus tends to become inactive through successive inoculation into calves and must be activated by passage through certain animals, notably the rabbit. From this animal, it is possible that another virus is added or there is an activation of the cow-pox strain which has a predilection for the nervous system. The majority of complications have occurred in the Netherlands and Great Britain (J. A. M. A. 93: 391 (Aug. 3) 1929, London

correspondence). In the former country there have been 139 such complications of vaccination with 41 deaths during the years 1923 to 1927. In England, a committee, headed by Sir Humphry Rolleston, was appointed by the government to investigate the condition. Among the recommendations of this committee (J. A. M. A. 93: 1076 (Oct. 5) 1929, London correspondence) were (1) that only 1 insertion of the vaccine be made (multiple scarification and cross hatching were discouraged), (2) primary vaccination should be performed on infants 2 to 6 months old because the reactions are milder and the complications fewer at that age, the vaccination should be repeated at the age of 5 to 7 years when the child is entering school, and again at 14 to 16 years of age when many children are leaving school, (3) No person should be vaccinated who is suffering from illness or who has a skin eruption or disease, (4) The physician must keep a record of the vaccine material that is used so that its source may readily be traced.

**SPINE — ANOMALIES** — Short neck, with the posterior hair growing well down on the neck, giving the appearance of the head being set upon the shoulders (*Klippel-Feil Syndrome*), has usually been associated with cervical Pott's disease, but is said at times to be the result of congenital malformations of the vertebræ. O. Crouzon and R. Liège (Bull. et mém. Soc. méd. d'hôp. de Paris 52: 917 (June 7) 1928) report 1 such case, while P. Ingelrans and J. Piquet (Rev. d'orthop. 15: 297 (July) 1928) report 2 additional cases. There is, of course, no treatment available, the



condition being one of scientific and diagnostic interest

Showing one more reason for the advisability of radiographing each and every case of pain and weakness in the upper extremities, frequently passed by with the diagnosis of neuritis, H. Roger, J. Reboul-Lachaux and Chabest (Paris méd 1:596 (June 30) 1928) report a case of *fusion of the atlas and occiput*, probably congenital in origin, no treatment is suggested

T. A. Willis (Am J Surg 6:163 (Feb) 1929) analyzes vertebral anomalies, classifying them as phylogenetic, developmental and acquired. The first group includes complete and partial sacralization of the last lumbar vertebra, complete and partial asacralization of the last sacral segment, and enlarged transverse processes of the last lumbar impinging upon the sacrum or ilium. These affect the stability and mobility of the spine [being one of the frequent underlying factors in spinal deviations—Ed]. The developmental types are defective, or absence of, the spinous processes and separation of the neural arches. They favor sprain, strain and spondylolisthesis. The acquired varieties are due to injury or disease, the most frequent causes are fracture and arthritis. [This entire report shows some of the causes of *back pain* that may be overlooked.]

A study of the malformations of the lumbo-sacral region of the spine, using the x-rays of over 3000 patients, a clinical study of all those whose roentgenograms showed abnormalities, and the dissections of 40 cadavers are used by J. F. Brailsford (Brit. J Surg 16:562 (Apr) 1929) as a basis for his conclusion that these various developmental irregularities may exist

without giving rise to symptoms. Anomalies existed in 26.4 per cent of the material examined. Should symptoms occur and the x-rays show some abnormality, careful study should be made to establish the relation of the malformation to the symptoms.

Some *low back aches* are the result of *sacralization* of the fifth lumbar vertebra, the elongated processes impinging on the ilium. Delchef (Arch franco-belges de chir 31:229 (Mar) 1929) advises **resection** of these processes to relieve the pain. His technic is not given. [The usual technic is posterior incision along the iliac crest, well posterior, bringing the incision down along the side of the sacrum, separation of the muscles until the process is reached, some resecting with an osteotome, others with Rongeur forceps. The operation is, as a rule, difficult because the process lies deep and is liable to be lost after it is cut. Thorough freeing of the process is essential. It should be grasped before resection and a thin tubed tonsil snare with rather heavy wire would be found useful for grasping, as it will not take up space in wound—Ed.]

In other cases of *low back pain* associated with vertebral anomalies and apparent instability of the last lumbar on the sacrum, and not due to elongated lateral processes, Hibbs and Swift, from a study of 150 lumbo-sacral fusions (by the method that bears Hibbs' name) found that this operation is the best method of relieving these cases, particularly where the condition has been resistant to other types of treatment. [There is no question about the efficiency of fixation, of the bony type, there is, however, a difference of opinion as to

method, some prefer the Hibbs method which is rather complicated and requires considerable time, others prefer the inlay bone graft, according to the technic of Albee, as it is easier and takes much less time, the results from either are good—Ed]

#### HABITUAL SUBLUXATION.—

V Chlumsky (Zentralbl f Chir 56 69 (Jan 12) 1929) presents the case of a 16 year old girl who dislocated at the atlo-axial articulation after a fall. It recurred a number of times, but each time was easily replaced. Prolonged support of the head effected a cure.

#### TUBERCULOSIS (POTT'S DISEASE)—DIAGNOSIS—

J Fraser (Edinburgh M J 36 133 (Mar) 1929) states that the disease occurs more often between the second thoracic and the third lumbar, particularly in the tenth, eleventh and twelfth thoracics and the first lumbar vertebrae. In the physical examination of the patient one should pay particular attention to (1) observation of the patient's general appearance and nutrition, (2) a study of the body attitude and gait, (3) inspection of the spine, (4) permanent record of the spinal outline, (5) investigation of the active and passive spinal movements, (6) examination of certain areas of the body for cold abscesses, (7) tests of the reflexes, the superficial and deep sensation, and the motor function, (8) a record of the compensatory pains occurring in the cranium, thorax or pelvis, (9) examination of the heart and vessels by the usual clinical methods, and (10) antero-posterior and lateral x-rays of the spine. Treatment should be by **fixation** [author does not state type] until the

process of holding (ankylosis) is complete.

The prognosis of Pott's disease has been considered by R K Ghormley and J I Bradley (J Bone and Joint Surg 10 796 (Oct) 1928), in a study of 27 cases, and they have concluded fusion (natural ankylosis) between partially destroyed vertebræ is a favorable sign, as is decrease in the size of the abscess. Calcification of the abscess does not necessarily signify improvement.

**TREATMENT**—Conservative handling of these cases, particularly of the cervical type, is advocated by L S Fry (Lancet 1 600 (Mar 24) 1928), who describes a "boat" of plaster of Paris, which rests upon wooden blocks on the bed, high enough to permit the use of a bed pan, the height also permits motion of the legs.

That paraplegia can never be a contraindication to **bone grafting** in the spine, is the conclusion of R Leriche (Bull et mém Soc nat de chir 55 461 (Mar 30) 1929) in commenting upon a case of quadriplegia with sphincter involvement. He has also combined **laminectomy** with bone graft, in compression paraplegia, with a happy result. [It is gratifying to note that bone graft in paraplegia is coming into its own, we have seen several excellent results, that made us rather regret a laminectomy done in earlier years, although the result was good—Ed]

Emphasizing the economic importance of the **bone graft** operation, and stressing that the graft should cover 3 vertebræ above and 3 below the involved area [the usual practice being 2 above and 2 below—Ed] M Kirschner (Ztschr f Tuberk 51 106 1928) reports 50 per cent healing in

100 cases, with but 14 per cent healing in conservatively treated cases

A paper that has received much attention by abstractors is the one by R A Hibbs and J C Risser (J Bone and Joint Surg 10 805 (Oct) 1928) in which they report 325 fusions done on 286 cases. Thirty cases were excluded because of short follow up period, 181 were living and cured, 10 others were cured of spinal tuberculosis but succumbed to other causes, 8 patients were not cured, 67 patients died, 81 per cent of deaths being due to tuberculosis or directly related causes. Immediate operative mortality, 3 patients. This makes 534 reported to date, with an operative mortality of 0.5 per cent. [Considering the shock incident to extensive fusions, the mortality rate seems extremely low —Ed]

F C Kidner and F Muro (*ibid*, 9 649 (Oct) 1927) divided 14 children into pairs, one of each pair being treated by fusion the other by conservative measures. From a study of these cases they conclude (1) that long rest without weight bearing is necessary. (2) Cases fused require as long and careful after-treatment as those not fused. (3) When cured the non-fused cases have more flexible spines than those that were fused. (4) The possible shortening of convalescence does not justify the risks incident to fusion. [It would be very interesting for some one to divide older cases in the same manner, and use not only the fusion but the bone graft. We believe the latter to be the more advantageous from every viewpoint —Ed]

**SPLEEN. — PHYSIOLOGY** — The physiology of the spleen still has

many vacant chapters and much that is controversial. Indeed the finer histo-anatomy, especially of the blood supply, needs more facts and correlation. J W McNee (Glasgow M J 111 65 (Feb) 1929) gives some interesting data relative to the spleens of lower animals. A true spleen appears first in fish, in which it is relatively large and uncomplicated in structure. As evolution progressed, the spleen became relatively smaller but increased in complexity. The first suggestion of Malpighian follicles appears in reptilia. In birds, the organ is already quite complicated. The spleens of primates are so alike, they cannot be distinguished histologically. Studies of spleens of lower animals have already yielded comparative data of value to man, just as similar studies of other organs have done.

Numerous reports of physiological experiments have appeared, mostly confirming or refuting previous views, in other words, more fuel is added to the controversial fires. P Barco (Arch ital d chir 23 1, 1929) in dogs, found a temporary diminution in gastric secretion and no modification of mobility after splenectomy. The blood supply of the spleen is unique. The artery and vein are very large, there is a sort of two-way circulation, one through and the other around the pulp. The arrangement allows of a storage which can be emptied on physiological demand. C Henschen and H Reissinger (Deutsche Ztschr f Chir 210 1, 1928) studied the effect of various conditions on the volume of the organ. Thus the different effects of ether and chloroform on blood-pressure were reflected on the spleen, during in-

fusions and transfusions the spleen is able to prevent overloading by taking up the excess fluids, etc J Barcroft and J G Stevens (J Physiol 66 32 (Sept) 1928) have shown that pregnancy and menstruation both influence the size of the spleen, it becomes much smaller during these processes V. H. Moon (Arch Path. 5:1040 (June) 1928) states the spleens of negroes weigh less than those of white persons.

The hematopoietic action of the spleen is taken advantage of in the treatment of anemia. A Zih (Arch f d ges Physiol 218 736, 1928) fed patients with daily doses of 3 Gm (45 grains) of *desiccated spleen* and believes it was beneficial in a few cases of anemia of unknown origin, but not in post-operative or other forms of known causation Splenectomy in normal animals does produce some irregularities in the erythrocyte morphology and counts

**PATHOLOGY**—The organ belongs, in part at least, to the reticulo-endothelial system As such it is of great importance in phagocytosis Its function of filtration, according to W. L. Robinson (Ann Surg 88 333 (Sept) 1928), is electrophysical, substances carrying a negative charge are adsorbed to the pulp cells

*Regeneration of the spleen*, as studied by G Amormino (Arch ital. di chir 20 559, 1928) occurs readily, and in addition, nodules of splenic tissue appear in the omentum, kidneys and other organs M Morrison, M Lederer and W Z Fradkin (Am J M Sc 176 672 (Nov) 1928), describing *accessory spleens*, call attention to the fact that their presence may nullify the ordinarily good results obtained from splenectomy in such conditions

as thrombocytopenic purpura The accessory spleens gradually enlarge and assume compensatory functions Accessory spleens are quite commonly found of sizes easily seen at operation or autopsy. But, if tiny nodules are able to become quite large, they probably constitute an adequate cause for certain operative failures, since they cannot be discovered and removed at the time the spleen is removed Distinction should be made between hemolymph nodes and spleens, hemolymph nodes contain no central vessel in their follicles

As far as the pathology of the spleen is concerned, most of the interest centers, as usual, about the *enlargements* Note of certain forms is contained in this volume under the heading "BANTI'S DISEASE," wherein it is stated that **splenectomy** should be considered in the "primary" enlargements, but not in "secondary" enlargements

**RUPTURE** of the spleen is apparently of more common occurrence in these days of automobile accidents There is no pathognomonic symptom except perhaps persistent left-sided dulness on percussion Immediate laparotomy and removal of the ruptured organ is the treatment It is well to remember that a pathologic spleen often ruptures more readily than a normal organ, and trivial trauma may accomplish this disaster

**GAUCHER'S DISEASE** is being recognized more and more as a generalized condition of the reticulo-endothelial system wherein large pale cells accumulate in the spleen, liver, internal lymph nodes and bone marrow Some fault of lipid metabolism allows a cerebrosid or "cerasin" to be

deposited in these cells. **Splenectomy** has cured no cases because this does not remove the primary fault, but it has relieved some and prolonged their lives. The osseous changes have been studied by x-rays and apparently a veritable osseous form has been distinguished, but perhaps it is but an early stage. The changes are medullary absorption, cortical thinning and expansion of the bone, in scattered islands doubtless the sites of accumulation of the Gaucher cells. The x-ray pictures are said to be fairly characteristic. Just what relation hypercholesterinemia and the occasional associated splenomegaly, liver enlargement, xanthochromia, etc., have to true Gaucher's, or Nieman-Pick's splenomegaly is not clear. Probably there exist several different kinds of faulty lipid metabolism (S. C. Dyke, *J. Path. and Bact.* 31: 173 (Apr) 1928).

**ABSCESSSES** of the spleen occur in any sepsis. Many begin as infarctions. Typhoid abscesses occur occasionally during the first weeks of the infection, but more frequently weeks or even months elapse before suppuration begins. The *diagnosis* rests on general grounds of septic fever, leukocytosis, etc., tenderness in the region and x-ray findings of elevation and fixation of the left diaphragm. It so happens that other foci may clear in the course of a septicopyemia, leaving an abscess of the spleen as the residue. Operation consists of **splenectomy** or **splenotomy with drainage** (A. E. Billings, *Ann. Surg.* 88: 416 (Sept) 1928).

**TUMORS** — Primary and also secondary tumors of the spleen are quite rare but occasional cases of even the former are reported. Thus,

O. Schneidewind (*Semana méd.* 2: 288 (Aug 2) 1928) encountered a primary sarcoma weighing 2250 Gm (75 ounces). There were metastases in the lumbo-aortic lymph nodes and in the lungs.

**CYSTS** — Of cysts of the spleen, H. Gatersleben (*Deutsche Ztschr. f. Chir.* 212: 139, 1928) reports a unilocular growth containing debris and considerable amounts of cholesterol. Its origin is not determined. Since the wall was calcified, a roentgenogram determined its presence. R. Brandberg's (*Act. chir. Scandinav.* 63: 346, 1928) cases were a lymphangioma with cysts (later in the liver also) and a papillary pseudo-mucinous cystoma probably secondary to a primary growth in the ovary which had been extirpated 25 years before.

**SPLENECTOMY.** — Contrary to the general opinion, H. Kulka (*Deut. Ztschr. f. Chir.* 219: 119 (Sept) 1929) asserts that splenectomy does not cause any change in the blood picture. Erythrocytes containing Jolly bodies are found only occasionally and not at all after 2 years. The osmotic resistance of the erythrocytes to hypotonic salt solutions is increased after the first week, but after 2 years it is again normal. There is no change in the coagulation time. Immediately after the splenectomy a leukocytosis is present. Up to the fourth week it is neutrophilic in character, thereafter, it is a relative lymphocytosis. Eosinophilia appears some time during the second month and, together with a lymphocytosis, is present even 10 years after the operation. Monocytosis was not noted. Six months after the splenectomy, the epinephrine reaction was negative, 2 years later

the patient reacted normally. Swelling of the lymph nodes was absent in the whole series studied and removal of healthy spleens, experimentally, does not interfere with bodily function. It is assumed that the resting portions of the reticulo-endothelial system assumed a vicarious action.

**STATISTICS.**—The importance of statistics in the treatment of data, either clinical or experimental, is just beginning to be generally recognized. From them an idea as to the prevalence or recession of disease, the influence of one method of treatment as compared with another, and as to prognosis can be obtained more often than not. Statistics deal with quantity and frequency, and the statistical method represents the ways and means of handling quantitative data. A paper by H. L. Dunn on "The Application of Statistical Methods in Physiology" (*Physiol Rev* 9 275 (Apr) 1929) gives desiderata which are equally applicable in clinical investigations. In fact, more so, since clinical material is affected by a multiplicity of causes, but few of which are under the control of the observer in so far as antecedent relations are concerned. Dunn made an analysis of some 200 medical-physiological papers. He found that in over 90 per cent statistical methods were necessary and not used. In almost 40 per cent conclusions were made which could not have been proved without adequate statistical treatment. About half the papers should never have been published as they stood, either because the numbers of observations were insufficient to prove the conclusions,

or because more statistical analysis was essential.

Dunn gives in an understanding way the chief statistical methods and the principles underlying their use. His summary can be quoted verbatim to advantage. He writes "Statistical method is a scientific tool which can readily be adopted for the use of physiological data. It is useful as a laboratory aid to an unbiased critical attitude. It describes in an adequate and simple way a mass of complicated data. It helps in testing the reliability of technic. It measures significance of experimental results. It evaluates the experimental control. It holds constant factors which otherwise would have to be considered as experimental variables. It measures differences between kinds of constants or descriptive terms and tells the degree of such differences. It helps in generalization of results by evaluating the likelihood of variations due to sampling. It brings together and describes the degree of relationship between widely different kinds of variables. It opens up the possibility of mass analysis with the resultant prospect of defining broad general laws. Examples of the value of statistics in public health are everywhere to be seen. In the field of malignancy they have brought to a focus the question of whether the increase in cancer deaths is real or apparent, *i.e.*, due to better diagnosis, etc. In the field of industrial hygiene they have called attention to the prevalence of this or that disorder as an occupational disease, and have thus made possible amelioration of working conditions. In the field of preventive medicine they have shown the benefits of protective vaccination

for smallpox, typhoid, diphtheria, etc., to the end that the attacks of fanatics against such procedures have been in general effectively stopped. Finally, as a result of intensive statistical study, the great business of Life Insurance has been put on such a foundation that hundreds of thousands of people are now protected from undue financial stringency, not only as regards dependents after death, but also in times of sickness and old age."

**STERILITY.** — A conspicuous awakening of interest in the problem of sterility and fertility has followed the work of Cary and Dickinson, Frank, Forsdike, Huhner, Meaker, Rubin, and Reynolds and Macomber. Three notable advances in the study of this subject are primarily responsible for the interest.

1 Huhner's development of post-coital examination has shown the true extent of male responsibility and the effect of abnormal cervical secretions on the spermatozoa.

2 The transuterine tubal insufflation (*Rubin test*) and the visualization of the tubes by the injection of iodized oil developed the responsibility of tubal occlusion as a factor.

3 General progress in endocrinology and the synergistic relationship of the pituitary, thyroid and ovaries have evolved a new field of approach in therapy.

**DEFINITION** — A woman is presumptively sterile who does not conceive, especially if no contraceptives have been employed, for 3 years after marriage.

**ETIOLOGY** — *Male Responsibility* — In 1763 reported cases of sterile unions in which semen was examined

by 28 observers, the average proportion of sterility due to poor semen stands at 31.25 per cent. Huhner, in the largest single series, found a defective semen present in 20 per cent. of 279 men, but states this figure is too low because men who know or believe themselves at fault are prone to decline examination. J. O. Polak (*Surg. Gynec. Obst.* 44:520 (April 1) 1927) found that about 90 per cent. of sterile women are married to men who have at some time had a Neisserian infection.

Reynolds and Macomber (*J. A. M. A.* 88:1718, 1927) believe that adding venereal infection transmitted to the female may bring the husband's responsibility up to one-half. It is necessary, therefore, to obtain a genito-urinary history of the husband, and examination of the male genitals, prostatic-vesicular strippings and condom specimens.

Defective production of spermatozoa may be due to testicular atrophy, underfunction, or underdevelopment. Endocrine failure, depressed constitutional states, exhaustion from sexual excess or obstruction in the passages may be responsible factors.

Cervical insemination with favorable cervical secretions are likewise essential for the proper transmission of the spermatozoa. Huhner's test which includes investigation of semen activity in the vagina and all levels of the cervical mucus to the internal os, is of inestimable value. Spermatozoa seldom survive more than 2 hours in the vaginal pool, but may retain vigorous motility in the normal cervix from 16 to 24 hours. The finding of non-motile spermatozoa in the cervical canal may be due to necropermia or to hostility of the

cervical secretions It is, therefore, essential to examine a condom specimen to differentiate the 2 conditions Examination of such a specimen should be made not later than 2 hours after ejaculation and maintained during the interval at body temperature The mere finding of a few active spermatozoa does not absolve the male, as millions of these organisms are killed in the migration through the vagina and uterus The chances for impregnation, therefore, are in direct ratio to the number and vitality of the spermatozoa Any semen specimen showing definite quantitative or qualitative inferiority is a potential cause of sterility

According to R Kurzrok and E G Miller (Proc Soc Exper Biol and Med 24 670 (Apr) 1927) semen exerts a highly specific lytic action on the mucin of the cervix Tests made with mucus from a patient with a leukorrheal discharge due to a lacerated cervix indicate that the digesting action of normal semen is markedly diminished or stopped by the presence of pus in the mucus The lytic substance of the semen may be an important factor in the passage of spermatozoa up the genital tract and its absence may be an etiologic factor in some cases of sterility in which no explanation has previously been offered

Repeated failure to demonstrate any spermatozoa in the cervical or vaginal secretions within 24 hours after coitus, usually points to azoospermia which is the only condition in the male that precludes the possibility of fertilization

#### STERILITY IN THE FEMALE.

—In the light of recent research, a proper study of the female factors in the production of sterility includes a

careful general and gynecological history, a complete physical examination with special emphasis as to endocrine and abdomino-pelvic study, a routine blood test and basal metabolism, a study of the endocervical secretions, a post-coital examination and a tubal insufflation with a subsequent iodized oil injection, if necessary In a study of 236 patients who were treated, Dickinson found a single cause for sterility in only 6.8 per cent with an average of 2 causes to each patient, while 31 or 13 per cent had 3 or more possible simultaneous reasons listed, including male defects (R L Dickinson and W H Cary J A M A 88 1 (Jan 1) 1927)

**ETIOLOGY**—1 *Faulty Cervical Insemination*—Faulty cervical insemination may be due to dyspareunia, to anteversion of the cervix caused by retroversion of the uterus, or to an elongated anteflexed cervix with redundant vaginal walls

It is essential that the semen reach the cervical canal directly If it reaches the vagina only, the acid vaginal secretion may destroy it S R Meaker and W Glaser (Surg Gynec Obst 48 73 (Jan) 1929) found the hydrogen ion concentration of cervical secretion varying between 8.0 and 9.0 An excessively high acidity may occasionally cause sterility, although this is infrequent In the series reported by C Mazer and J Hoffman (Med J and Rec 129 90 (Jan 16) 1929) of 500 sterile unions, 10 per cent were due to hostile cervical secretions

2 *Uterine Abnormalities*—It is now believed that uterine defects are not important causes of sterility, although often associated with other conditions which render conception



impossible. Thus, an infantile uterus may be associated with sterility because of infantile ovaries failing to ovulate. Acute antelexion which permits the passage of a uterine sound is seldom responsible for sterility. R. L. Dickinson and W. H. Cary (J A M A 88 1 (Jan 1) 1927) grouped all underdevelopment cases in 1 division of antelexion, underdevelopment and habitual amenorrhea.

Symptomless retroversion of the uterus *per se* is not responsible for sterility. An exception to this is found in those patients in whom spermatozoa cannot be found in the cervix, although the vaginal secretions yield many. This may result from the anterior position of the cervix. Retroversion when associated, however, with chronic pelvic congestion and cystic ovaries may well be the cause of sterility.

3 *Stenosis of the Tubes*—Tubal occlusion may be the result of spasm, a developmental defect or an antecedent inflammation. Stenosis may follow gonorrhea, abortion, appendicitis, ectopic pregnancy, instrumentation or the use of intrauterine stems. Dickinson noted an occlusion of the Fallopian tubes in 35 per cent of the patients, but when cases of azoospermia were omitted the percentage was reduced to 25.

The *Rubin test* to determine the patency of the tubes has had many recent modifications. The elimination of a possible tubal spasm by antispasmodics is stressed. I. C. Rubin (J A M A 90 99 (Jan 14) 1928) emphasizes the importance of a uniform slow flow of the carbon dioxide gas under a constant pressure rate. Three signs are necessary to prove patency: (1) There must be a drop

of pressure within certain limits during the insufflation, (2) the patient must complain of shoulder symptoms, (3) there must be x-ray proof of gas in the peritoneal cavity. The addition of a kymographic attachment has made it possible to recognize the presence or absence of rhythmic contractions and peristaltic movements of the tube. Occasional deaths reported by Moench due to embolism after insufflation should warn against the possible dangers of this method.

The *x-ray examination* of the uterus and tubes is facilitated by the use of lipiodol. Heuser, in 1925, was one of the first to employ iodized oil for gynecological diagnosis. Lipiodol injections, according to J. Jarcho (Surg Gynec Obst 45 129 (Aug) 1927, 46 752 (June) 1928), are entirely safe and innocuous. In uterosalpingography, a 10 c.c. syringe is filled with the oil and attached to a cannula inserted into the uterine cavity. About 5 c.c. of iodized oil is usually sufficient for a uterosalpingogram. Forsdyke advises an oblique x-ray to be taken at the time of injection and while the cannula is in the uterus. A second roentgenogram taken a day or two later will show iodized oil in the peritoneal cavity. This oil is absorbed and disappears from the peritoneal cavity in 7 to 10 days. It disappears from the uterus, by gravity, in 1 or 2 days, but when injected into closed tubes may show a shadow for several months. I. C. Rubin (Surg Gynec Obst 46 87 (Jan) 1928) reports untoward results in 4 of 50 patients in whom lipiodol was used. W. H. Cary (M J and Rec 130 1 (July 3) 1929) employs 1 dram (4 Gm.) of freshly prepared 15 per cent sodium iodide

solution to study these patients by x-rays

4 *Defective Ovulation*—In ovarian hypofunction, the opportunity for fertilization is diminished in proportion to the reduced ovulation. In 77 cases of oligomenorrhea, I. C. Rubin (Am J Obst Gynec 18 603 (Nov) 1929) found sterility present in 30 per cent. Menstruation was habitually delayed in 10 per cent of patients whose marriage was sterile, the longer the period of delay, the greater the percentage of sterility. Total fertility was diminished in direct proportion to the reduced number of periods per year.

Ovarian hypofunction may be due to endocrine disturbance or to antecedent pelvic infection. The resultant thickened tunica albuginea impedes maturation and rupture of the Graafian follicle with resultant absence of corpus luteum formation. Lack of inhibitory control of the corpus luteum causes an excess of follicles to ripen, but failing to rupture, these become the seat of cystic degeneration. In these patients, there is invariably an associated endometrial hyperplasia producing prolonged menstrual flow. If ovulation does occur, an existing infarcted and hemorrhagic endometrium often prevents conception. S. R. Meaker (J A M A 92 1493 (May 4) 1929) found that endocrine failure and depressed constitutional states might also effect ovulation.

Obesity was found by R. L. Dickinson (Dickinson and Cary J A M A 88 1 (Jan 1) 1927) in 27 per cent of 230 sterile women. Amenorrhea and defective development was also present in 25 per cent.

5 *Endocrine Disturbance*—Recent investigation of the problem of ster-

ility has concerned itself in a great measure with a study of the interrelation of the endocrine glands. The synergism of the anterior portion of the pituitary, the thyroid and the ovary is definitely established.

B. Zondek and S. Aschheim (Klin Wchnschr 6 1322 (July 9) 1927) demonstrated the effect of anterior pituitary hormone on the ovaries by the transplantation of small fragments of anterior pituitary gland into immature white mice. One ovary is removed as a control, the other ovary shows, 3 or 4 days after transplantation, matured Graafian follicles, corpora lutea and marked vascularization of the stroma, thus revealing the important rôle played by disturbance of pituitary function.

R. T. Frank (Surg Gynec Obst 45 189 (Aug) 1927) has shown that the undiluted follicle fluid of the ovary will produce a marked hyperplasia of the uterus, vagina, and breast in virgin immature rabbits. He drew the warranted deduction, therefore, that the sexual cycle is initiated by and is due to ovarian follicular action. According to Frank, many sterile women have a uniformly low pre-menstrual blood threshold level as manifested by a weak quantity of sex hormone, so that the uterine mucosa does not have the proper endometrial preparation necessary for successful nidation.

C. Mazer (Personal Communication) believes that if a patient shows no evidence of female sex hormone in the circulating blood in the course of 6 weeks, the curability of the amenorrhea is hopeless. In several of his patients near the time of an apparently normal menstruation, he found an absence of pre-menstrual endometrium and female sex hormone. Such

a type of menstruation, it constant, would preclude fertility

Thyroid failure in the adult female produces no palpatory evidence of genital atrophy, yet is occasionally the cause of infertility. The endometrium is hyperplastic and gives rise to amenorrhea and prolonged bleeding when menstruation does occur. Repeated abortion may be an expression of or consequent upon thyroid failure.

S. R. Meaker (Boston M. and S. J. 197:773 (Nov.) 1927) found the anterior lobe of the pituitary a factor in sterility in 60 per cent of his endocrine patients, the thyroid at fault in 30 per cent and the internal secreting portion of the ovary in 10 per cent. An associated endocrine dysfunction is found in about 25 per cent of the cases of sterility.

6 *Relative Sterility*—According to Meaker (J. A. M. A. 92:1493 (May 4) 1929), infertility in which neither partner shows any conspicuous lesion is occasionally discovered. Both parties are of low fertility, although either partner may produce offspring in a highly fertile mate. Thus D. Macomber (J. A. M. A. 90:113 (Jan. 14) 1928) made counts of spermatozoa and found variations between 300 million and 100 thousand organisms per c.c. The latter group is one of low fertility in which the sex cells seem to suffer possibly because of a constitutional depression, nervous strain, faulty diet or lack of proper exercise.

*Contraceptives and Sterility*—Various contraceptive measures resorted to in the first 2 years of marriage may produce hostile secretions and chronic pelvic congestion inimical to conception. Cooper (Technique of Contra-

ception, 1928, Day-Nichols, Inc., Pub.), in a study of 5000 patients in a birth control clinic found that contraceptive measures *per se* are not a cause of sterility. However, the use of intrauterine stems may well be considered as a cause, because of irritation, erosion and infection of the uterus and tubes. Also the use of strong vaginal antiseptics, as undiluted bichloride of mercury, may cause sterility.

**TREATMENT**—A thorough knowledge of the etiological factors involved must be obtained before any course of treatment is outlined. For this reason the cooperation of the gynecologist, urologist and internist is essential for a proper study of the problem. General constitutional improvement with the elimination of all emotional worry is the first prerequisite. Meaker (J. A. M. A. 91:384 (Aug. 11) 1928) stresses the importance of a well organized sterility clinic.

According to Dickinson and Cary (*loc. cit.*) the curability of sterility, azoospermia omitted, stands at about 33 per cent. Omitting also gross tubal lesions, sterility was relieved in 47 per cent of the patients.

1 *Diet*—Recently diet has received considerable attention in the treatment of sterility, due chiefly to the investigations of Reynolds and Macomber (D. Macomber J. A. M. A. 93:1213 (Oct. 19) 1929). These observers report that a diet low in calcium has considerable effect in reducing fertility and may even cause miscarriage. They recommend a high protein and vitamin E diet, low in calories, with enough exercise to assure assimilation. Diet is also of great value in

the treatment of associated anemia or obesity.

2 *Tubal Insufflation* —The Rubin test as a therapeutic measure has recently been brought to the fore Polak (*loc cit*) found that pregnancy may follow insufflation by separating mild agglutinations and straightening tortuous tubes I C Rubin (Am J Obst and Gynec 17 484 (Apr) 1929) reports utero tubal insufflation followed by pregnancy in 205 cases out of a series of 2000 cases of infertility In Mazer and Hoffman's series, 18 patients became pregnant after the test All of the patients had tubes which opened between 160 and 200 mm mercury

3 *Irradiation* — Since 1915, when Van der Velde began to irradiate the ovaries in cases of amenorrhea, interest has been stimulated in this field. Patients with cystic ovaries respond to small doses of irradiation which act on the atretic follicles Rubin reported 12 cases of sterility with amenorrhea treated by x-ray using one-third the castration dose In 11 of these women, the menses were restored and 9 became pregnant In a larger series of 33 patients, 16 subsequently became pregnant

If, however, a primary numerical deficiency in the functioning follicles exists, Frank (*loc cit*) warns that the x-ray may even do harm This is especially true in cases of associated amenorrhea with obesity The difference between the stimulating and depressive dose is not great, and if ovarian function is definitely on the decline, small doses of irradiation may extinguish it completely

"Stimulation" of the ovaries by x-rays should be confined to patients with amenorrhea in whom a distinct

subthreshold blood cycle as manifested by a weak quantity of sex hormone, can be demonstrated

According to Rubin (Am J. Obst and Gynec 18 603 (Nov) 1929), mild pituitary gland irradiation has proved of value in regulating menstruation in patients with irregular periods The mechanism of such influence is unknown Hypophyseal irradiation, therefore, should precede ovarian radiation.

4 *Organotherapy* —Endocrine therapy offers probably the greatest possibility of success in the future in the treatment of sterility It is essential, however, not merely to substitute a glandular element which is deficient, but to restore function to the inactive ovaries

Numerous preparations of gland extracts, as ovarian residue, varium, agomensin, corpus luteum and anterior pituitary, have all been administered with but mediocre success The water soluble commercial extracts show lack of potency with rapid deterioration

Ovarian extracts are assayed according to recent pharmacologic methods on the mouse unit system Of foreign products, progynon, menformon, hormova and glandofol are prepared in accordance with this plan In America, estrogen and amniotin have been elaborated, but as yet no satisfactory or uniform results have been observed

Follicular hormone has been used by E Novak (J A M A 90 339 (Feb 4) 1928) in amenorrhea of the functional type He gave as high as 100 mouse units per ampule with no success He believes that the follicular hormone, which appears to be a growth principle, is not capable of

building the endometrium up beyond the interval phase and that the corpus luteum extract exerts its effect only in an endometrium already partially transformed by the follicle. For these reasons, Novak advocates daily injections of corpus luteum. This cycle is then repeated. Occasionally, good results are obtained.

B Zondek (Zentralbl f Gynak 53 834 (Apr 6) 1929, Ztschr f Geburtsh u Gynak 95 361, 1929) offers prolan as an extract of the anterior lobe of the pituitary, since this gland has been shown to be such a powerful stimulant to the ovaries. A potent extract of this gland, however, is thus far unavailable.

Frank (*loc cit*) finds that desiccated thyroid substance is the only endocrine product of value and is especially useful for patients with a low basal metabolism.

5 *Surgery*.—Analysis of the figures of 18 operators shows an average of 14 per cent curability of stenosed tubes. Polak (*loc cit*) favors the round ligament plus Dudley operation for retroversion. Brickner advocates the Dudley posterior "lip splitting" for ante flexion. For stenosis and ante flexion, Pozzi and Barnsby report 170 lateral splits of the cervix with 31 per cent pregnancy. In myomectomies for sterility, Essen-Møller reports cures in 10 per cent. Cary secured 33 per cent cures in his group of underdevelopment, ante flexion and habitual amenorrhea by using dilatation and the Baldwin stem. Reynolds and Macomber (*loc cit*) claim surgery of the ovaries is the most important feature in the treatment of sterility in the female, this includes freeing of the adnexæ and resection of the ovaries.

One may offer sterile women as a hope for cure, therefore, from 1 chance in 7 in cases of closed tubes, and 1 in 3, in more favorable conditions. It is important that the physician should refrain from extending unreasonable hopes and from operating merely because the patient complains of sterility.

**STEROLS.**—Increasing interest in this group of compounds comes from the fact that at least one of them (*ergosterol*) carries the properties of vitamin D, when irradiated under proper conditions, and is useful in conditions of deficiency in this dietary essential. It is on the market under the Council designation of *Viosterol*. Ergosterol is widely distributed in living material, even having been found in erythrocytes. When *ergosterol* is subjected to ultra-violet radiation, the activation through the photo-chemical change may go beyond the production of the potent vitamin and result in a non-protective compound, different from the original sterol. From this it is clear that activation must be carefully regulated. Excessive doses of irradiated ergosterol may lead to arteriosclerosis, calcification in the kidney and lung (but not in the heart, liver, spleen, or suprarenals) and death.

In this connection, it is significant in connection with the harmful effects known to result from hypercalcemia, that overdosage with irradiated *ergosterol* in young animals raises the inorganic phosphorus of the blood by 50 per cent and the calcium by 25 per cent. Apparently other things than parathyroid secretion are important in the regulation of the blood calcium level. The products formed when cholesterol or ergosterol are

irradiated have hemolytic properties. On the other hand, non-irradiated *cholesterol* has been used with apparently favorable results in the treatment of pernicious and other anemias. It is believed by some that the harmful effects of overdosage with these products is due to contaminating substances. Maybe so, but whether or not, it is with the irradiated product that care must be exercised in its use.

Turning now to *cholesterol*, W L Mattick and K W Buchwald (J Cancer Research 13 157 (July) 1929) report that a disturbed plasma-whole blood cholesterol is present in cancer patients, being greater than 1.0 in 86 per cent of the cases, whereas in healthy people the ratio is less than 1.0. In non-cancerous disease, some 67 per cent showed the ratio normal for well people. There is a tendency to a *hypercholesterolemia* in the plasma, with little change in the corpuscles. These clinical findings have been confirmed by experiment by others who have observed an increase in blood cholesterol of animals dying of transplantable inoculated tumor. Increase in blood cholesterol is also brought about by the injection of preparations of the anterior lobe of the hypophysis. Pituitrin, however, had no definite effect. Nor did anterior lobe when the animals had previously been ovariectomized. It is presumed that the reaction in normal animals is due to ovarian stimulation by the hypophyseal hormone. That this is probable follows from the fact that blood cholesterol is also increased when ovarian hormone is given.

The sterols are extremely stable compounds and retain their poten-

tiality for photo-chemical activation for hundreds of years. This is concluded from the work of H King, O. Rosenheim and T A Webster (Biochem J 23 166, 1929). These investigators prepared cholesterol esters from the brain of a mummy which gave the specific color reactions of ergosterol and the proper absorption spectrum (280 to 290  $\mu$ ) for this compound. The esters were then irradiated and the product fed to rats on a rickets-producing diet. The compounds had an anti-rachitic action, thus proving by biological methods the presence of ergosterol and its great stability.

#### STRABISMUS.—ETIOLOGY —

From studies of instances of strabismus in uniovular and biovular twins, P J Waardenburg (Nederl Tijdschr v Geneesk 2 5783 (Nov) 1928) concludes that inheritance of the condition rests on the joint action of inherited factors, some of which are in all probability of a recessive nature. He reports a case of convergent strabismus and amblyopia in uniovular twin boys. In one the amblyopia was in the right, in the other, in the left eye. The boys are now 16 years old. Spontaneous cure of the strabismus has taken place. The degree to which the amblyopia has improved differs widely, however, in the 2 boys. At the beginning the refractive power was about the same in the 4 eyes. It increased in all, but not uniformly. At the end of 9 years the anisometropia was 1.75 diopters in one boy, and 2.5 diopters in the other.

**DIAGNOSIS.**—B F Royer (Am Med 35 594 (Sept) 1929) emphasizes that early recognition of muscle faults is imperative. Physicians must

impress upon social workers and parents the need for prompt action as the early muscle fault is but an indication of a fundamental fault farther back in the eye. These motor anomalies are susceptible in most instances to early education and training, and treatment should be initiated with the definite understanding that it is likely to continue for a period of several years.

**TREATMENT.**—L. H. Schwartz (Am. Med. 35 598 (Sept.) 1929) states that the treatment of squint is primarily and principally non-surgical. The first consideration is the preservation of sight in the eye by correcting the refractive errors with proper glasses at the earliest age possible. After the lenses have been prescribed, attempt should be made to develop fusion by muscular exercises. If this is not entirely successful an operation may be performed.

H. J. McCoy (J. Iowa M. Soc. 19 485 (Nov.) 1929), in a discussion of the etiology of strabismus, makes it evident that squint cases should be studied with a view to educating and training the normal functions of the retinal reflexes, namely, by properly fitted lenses, if needed, by the forced use of the deviating eye by covering the fixating eye, and in some cases the use of atropine in the good eye, by orthoptic training of some kind, and by surgery of the extraocular muscles, to assist in approximating the eyes for orthoptic training. In all cases of strabismus it should be determined whether it is possible to develop the normal functions of the eyes and thus prevent amblyopia exanopsia.

F. W. Dean (J. Iowa M. Soc. 19 490 (Nov.) 1929) recommends the

following procedure regardless of the primary and contributory causes of squint. Any error of refraction should be fully corrected. If squint is relieved by the use of glasses, it is an indication that the fusion sense is normal. This may be all that is necessary, though if after wearing the glasses for a year or more the eyes still deviate when the glasses are removed, a muscle shortening, as an aid to insure parallelism, is advisable.

If the use of glasses does not correct the deviation, it is likely that the fusion sense is absent or weak or the muscles are poorly innervated. In either case a muscle shortening should be done. After the refraction is corrected and the eyes are aligned so that the picture falls near the macula of each eye, the education of a weak fusion sense is much easier and should then be attempted.

K. R. Smith (Brit. J. Ophth. 12 581 (Nov.) 1928) states that the cause of convergent squint is the arrest of development of binocular vision in hyperopia. Many hyperopic children make good progress in acquiring binocular vision at games out of doors and in ordinary use of the eyes, but when they are required to use their eyes for prolonged near vision, their sight is not sufficiently clear or the effort is too great for one eye and one-eyed sight results. The unused eye becomes less and less sensitive, and deviation follows. Unless attention is paid to the poor eye in the fitting of glasses, its sensitivity will not be restored.

In heterophoria the same sequence of events occurs, but the patient is able to retain the binocular vision he has acquired.

The treatment indicated is training

of simultaneous vision The author says, "Bring about sight of the same object with both eyes"

C A Worth (Editorial, Lancet 2 673 (Sept 28) 1929) found that of 193 cases which were brought to him when the duration of the squint was only one-eighth of the life of the patient, he was successful in preventing any degree of amblyopia in 165 In cases where the duration had been more than one-eighth but less than one-half of the patient's life, the corresponding cases of complete prevention were 73 out of 188, and in the cases where the patient had squinted for more than half his life, the complete cures were only 14 out of 604

Besides **occlusion** of the non-squinting eye, the non-operative treatment of squint consists in the **training** of binocular vision and of the fusion sense Hitherto this has generally been attempted by means of stereoscopic views and of the amblyoscope, by means of which the child is encouraged to combine the 2 images presented separately to the 2 eyes It is to Dr E E Maddox, the inventor of the "Maddox Rod" that we owe a new principle in non-operative treatment of squint By means of his "**cheiroscope**" the child's hands, as well as his fellow eye, are made to assist in the development of binocular vision He can trace the outline of a picture visible to one eye only with a pencil visible to the other eye alone, or he can play a game of catching a butterfly visible to one eye alone with a net held in the hand of the other side and directed by the other eye Such devices in the hands of properly trained guides are without doubt a great advance on previous methods In certain cases they may

even effect a complete cure of incipient squint and forestall the necessity of an operation

W W Lewis (Minnesota Med 10 726 (Dec) 1927) says that in a cross-eyed child, getting the eyes straight is not the problem, but only the result which comes of itself when the necessary and essential provisions are met These provisions are (1) Preservation of visual acuity in the turning eye which begins to be lost the moment the eye turns, (2) the development of fusion of the images of the retina of the 2 eyes into 1 image in the brain, which results in binocular single vision, (3) the relief of overstimulation of convergence, a result of excessive accommodation

In view of specific knowledge, it is hard to understand the prevailing idea that the age of 6 or 7 years should be waited for, before steps for the relief of the squint be instituted, unless it is that many men think that glasses cannot be safely given to children before that age It is unfortunate that such an idea should be so widely believed, for with the modern well guarded frames, children of 1 year of age are perfectly safe and take most readily to them It is at this early age that the most startling results take place, indeed, it may be only a matter of weeks or even days in getting the desired results, whereas a few years later, it may mean months, years, or even surgery, in addition

Lawrence Post (J Missouri M A 24 496 (Nov) 1927) says the time to treat crossed eyes is when they begin to cross The most frequent cause of deviation is the large error of refraction If treatment is not begun at the very beginning, the crossing eye will not develop normally, just as an un-



used muscle will fail to develop. During the first year, 2 courses are open: (1) The use of an occluding pad over the fixing or straight eye, (2) the instillation of atropine in the fixing eye to blur images in this eye and thus encourage the use of the crossing eye. In cases of alteration of the fixing eye, atropine should be used in each eye. As early as the second year, an accurate retinoscopy can be made and glasses prescribed. At this point it is best to prescribe the full correction, as found under atropine, unless this proves to cause so much blurring that the child persistently looks around the lenses, in which case the lenses must be reduced to tolerance. During this time, if the eye still crosses, atropine in the fixing eye and the daily use of the occlusion pad for not less than 2 hours should be continued. At the end of the second year, it will be possible to teach the child the names of simple pictures in outlines. Visual acuity can then be determined. The next step is parallelism, and an amblyoscope should be used; this is an instrument constructed so that images seen with each eye can be superimposed. Next, fusion is developed by exercise with the stereoscope, depth perception being thus encouraged.

**SURGICAL TREATMENT**—F. H. Rodin and W. F. Swett (Am J Ophth 11 369 (May) 1928) report a case of convergent squint due to paralysis of the external rectus following an injury. The patient was a man 61 years of age. Operation was done for cosmetic reasons. The first stage consisted in transplantation of the lateral halves of the vertical recti muscles to the insertion of the external rectus. This resulted in partial

correction. Nine weeks later a tenotomy of the internal rectus was done. This completed the correction and enabled the patient to abduct the eye to the extreme lateral position.

H. Roenne (Arch Ophth. 56 428 (Sept) 1927) states that various mechanical aspects of operation for the correction of squint are commonly misunderstood. An advancement of 10 mm. will not turn the cornea 10 mm., but combined recession of 10 mm. on the opposing muscle will accomplish it. A tenotomy retracts the muscle only slightly, but reduces its tension. After complete healing, the tension of the tenotomized muscle and the opposing muscle must be equal. Theoretically, exophthalmos should reduce the tension of the obliques and increase the tension of the recti, but muscle balance is not affected. As the muscles very quickly adapt themselves to the new situation, there is no interference with co-ordination.

The insertion of sutures is important, since it is possible to produce a difference in elevation by inserting one suture too high or too low. The insertion of sutures through the base of the cut tendon produces less effect than their insertion far forward, above and below the cornea. The latter method causes most post-operative pain because the tension on the muscle loop is greater.

**STREPTOCOCCUS INFECTIONS. — ETIOLOGY.**—W. Lowenberg (Klin Wchnschr 7 1170 (June 17) 1928) examined the smears from the pharynx of 44 healthy persons and 6 smears from tonsils removed on account of a chronic inflammation present. Many colonies

of streptococci were thus obtained which could be isolated and studied.

In addition to the large number of hemolytic streptococci, there were a large number of green streptococci of the viridans type found. In a long series of smear cultures, certain colonies were to be distinguished from all others by their peculiar greyish white color. They resemble enterococci from the intestinal tract. Cultured in bouillon, many of the colonies developed homogeneously and others crumpled. Most of them were diplococci and in short chains, but some were round, oval or lancet-shaped and occurred in masses.

Bacteriologically, these organisms were differentiated from the enterococci of the intestine and they were killed by one-half hour's exposure to a temperature of 56° C. The cultural and serological uniformity of these streptococci, according to the author, justify the classification of a new type of streptococci which, from their occurrence in the pharynx, he terms *pharyngococci*. The practical significance of these organisms is that when the organisms are found within pathological tonsils, they suggest the possibility of entrance into the blood stream and migration into other organs. Thus the discovery of such pharyngeal streptococci in cases of infection of the gall-ducts would point to the pharyngeal organisms as the source of infection. Infections in such locations by the *Streptococcus viridans* must necessarily be of very rare occurrence, since they have so little power of resistance against bile.

**TREATMENT.**—Although there is considerable experimental work being done upon the use of antistreptococcic sera in combating these infec-

tions and although all types of sera have their followers and promoters, except for isolated cases, Lowenberg (*ibid*) considers that the most beneficial result in overcoming the infection has been the use of blood transfusions.

E. Manoussakis (Bull. et mém. Soc. méd. d'hôp. de Paris 52:1412 (Oct. 25) 1928) attributes the unsatisfactory results from the use of sera to the diversity of the strains of streptococci. He believes that however polyvalent a serum may be, it still can lack many types of this mysterious form of bacterium. To many observers, the streptococcus has proven itself to be such a mediocre organism as to lead them to believe that no specific reaction could be produced by injecting it in either a human or animal subject.

In studying the toxins of the streptococci, the author prepared it by cultivating the organism on human serum diluted 10 times in physiological serum. Filtration was done after a 24-hour stay in the incubator. The maximum dilution, which when injected into the skin in a dose of 0.2 c.c. would give a distinct dermal reaction, was determined. A dose 100 times greater was injected into the skin to follow the progress of the immunity. The subject was considered vaccinated when there was only an insignificant or no intradermal reaction to the toxin and the subject's serum neutralized the effect of the toxin.

Similar investigations were carried out with polyvalent toxins and in some a polyvalent bacterial vaccine. In many of the subjects it was very difficult to obtain immunity. Having found some cases in which immuni-

zation was developed, the author used the serum or blood of the immunized subject in transfusions or injections in the treatment of streptococcic infections. He found the results most encouraging in 4 cases.

F Bass and K Jaroschka (Strahlentherapie 28 568, 1928) report some very interesting work upon the experimental increasing or resistance to streptococcal infection in rabbits by the use of **x-ray irradiation**. Artificial sepsis was produced in the rabbits to the amount which would kill normal animals in from 1 to 4 days. These animals were subjected to the rays over the middle third of the abdomen, it being given from 12 to 14 hours before the injection of the organisms.

At regular intervals following this, specimens of blood were taken from the irradiated animals and the controls and the organisms counted. The control animals succumbed in from 1 to 4 days, while the irradiated ones lived from 5 to 14 days and did not show any symptoms until 3 days before death.

These findings seem to indicate to the authors that there was an increased activity on the part of the reticulo-endothelial system and that the resistance could not be ascribed to an increase in the bactericidal power of the serum. It was also found possible to increase the resistance of animals already infected when the irradiation was given 5 hours after the infection and the animals lived 5 or 6 days longer than the controls.

**SULFHYDRYL.**—Due to the work of F S Hammett (Protoplasma, 1928-1929) and his associates, the

fundamental biological importance of the —SH or sulphydryl group has recently come to the fore. Studies carried on at the Research Institute of the Lankenau Hospital, Philadelphia, have established the fact unequivocally that this chemical group is essential for growth by increase in cell number. This was determined first by identifying a lead precipitate in material inhibited by the metal as a combination between lead and a sulphur compound analogous to glutathione then by stimulating cell proliferation with a series of synthetic organic compounds carrying the —SH group attached to the molecules. Even  $H_2S$  ( $H-SH$ ), the simplest sulphydryl compound, was found effective by Sharpe.

The reaction is specific to growth by cell multiplication, and in plants and paramacia is produced by very small concentrations of the order  $10^{-9}$  to  $10^{-7}$  parts of S. The response holds throughout the range of living things from plants, through paramacia, to rats and man.

The biological principle involved by these studies has been applied clinically to the healing of wounds and refractory ulcers of long standing in man by S P Reimann and F S Hammett (Proc Soc Exper Biol and Med 27 20 (Oct) 1929). At the present writing, the most useful form of sulphydryl for this purpose seems to be *thio-cresol* which combines the mild asepsis of the cresol radical with the growth stimulation properties of the —SH group. A 1:10,000 solution is applied as a wet dressing for alternate 24-hour periods. Since the compound is insoluble, 0.01 gram ( $1\frac{1}{4}$  grain) is dissolved first in 5 cc ( $1\frac{1}{4}$  drams) 95

per cent ethyl alcohol and then diluted with 95 c c ( $3\frac{1}{8}$  ounces) of distilled water

Hammett has proposed an interpretation of *malignancy* on the basis of this —SH work, a review of which is to be found in the Archives of Pathology, 8:575 (Oct) 1929

**SYPHILIS.—ETIOLOGY** —Some of the numerous modes of infection, other than the one most commonly known for syphilis, have been described in the literature A Buschke and A Joseph (Med Welt 2 1417 (Sept 22) 1928), interested in the transmission of the disease by the common use of a lip-stick, found motile spirochetes which had been dried for 2 hours upon this cosmetic preparation They believe the spirochetes found thereon were protected from the harmful effect of light

G Mestchersky and J Olessoff (Urol and Cutan Rev 36 382 (June) 1929), studying the infection of physicians by the handling of their patients, give a list in the following order (1) Obstetricians, (2) gynecologists, (3) surgeons, and (4) syphilologists The last named come last on the list as they are believed to be most careful The authors recommend the following preventive steps be taken (1) The physician should acquaint himself with all external manifestations of the disease, (2) rubber gloves should be worn, (3) in examining the mouth, larynx and pharynx, especially of children, the physician should protect the hand and the mouth by a mask, (4) the patient should be examined carefully for any signs of the disease before any surgical operations, (5) the physician should constantly bear in mind the

possibility of syphilis in the discharge of all of his professional duties

E Constantinescou and N Vatamanu (Ann d mal vén 24 161 (Mar) 1929) report a case of generalized papular and erosive syphilitic eruption and tonsillar and vulvar syphilids in a woman aged 42 years There was no preceding chancre and the lesions appeared 75 days following a blood transfusion which the patient had for a severe anemia the result of a metrorrhagia The donor had a positive Wassermann reaction and, at the time of the transfusion, had a mixed chancre but did not know the condition was syphilitic The patient's husband had a negative Wassermann Dufour (Bull et mém Soc méd hôp de Paris 53 511 (May 6) 1929), I Freuchen (Ugesk f Laeger 91 386 (May 2) 1929), and V Feldman (Arch Dermat, Syph 18 380 (Sept) 1928) all report similar cases of infection by the hemogenous route of blood transfusion

**DIAGNOSIS** —J A Kolmer (J A M A 93 1429 (Nov 9) 1929) attempts in a large measure to clear the field and the vision of the physician from the almost innumerable questions of doubt and lack of knowledge for decisions in the proper evaluation in serologic tests for the diagnosis of syphilis He firmly believes that there must be something of real and intrinsic value in the Wassermann reaction or it would not have withstood the 25 years of constant controversy over its value Secondly, it is known that although the reaction depends upon the use of an extract of the lipoids of beef heart or some other non-syphilitic tissue called the "antigen" combined with an antibody from the *Spirocheta pallida*, there is a

high degree of specificity under proper technical conditions, as this antibody is known to be produced by only one other disease condition which is frambesia tropica or yaws and which is very rare in the United States

In 1922 Kolmer emphasized the importance of dividing the errors of the Wassermann and other reactions into (a) the biologic and, therefore, unavoidable type, and (b) those which are technical and, therefore, avoidable by correction of human errors

A very important question has arisen as to the capability of any other condition yielding a positive serologic reaction beside syphilis and yaws. Stokes and Goeckerman have found positive reactions falsely reported in cases of leprosy, tuberculosis, the acute exanthemata especially scarlet fever, pneumonia, septicemia and particularly subacute bacterial endocarditis, trypanosomiasis, relapsing fever, arthritis, general anesthesia, malignancy, hepatic cachexia, pernicious anemia, malaria and pregnancy, Weil's disease and possibly diabetes and systemic mycotic infections. Kolmer himself appears ready to defend his opinions when he makes the statement that with his method and antigen, unavoidably positive results have occurred only in yaws and possibly trypanosomiasis and relapsing fever.

Thirdly, Kolmer believes the falsely positive reactions are the result of numerous technical errors which may of course with care be corrected. He cites 2 actual reports in his own laboratory where he was able to trace the errors first to a typographical error and the second to the work of a student technician which, under normal conditions, should have been

repeated but was not. The incidence of such errors in many hospitals and clinics surely allows the entertainment of a poor opinion of the reactions in the minds of many physicians.

The careful physician who is attempting to reduce to a minimum the possibility of falsely positive reactions is at present employing the services of 2 laboratories as a check and is choosing those which have contact with large amounts of clinical material for a frequent check of their results and methods. Kolmer believes there are many cases in which the use of the serologic reaction is indispensable for the detection of the disease in the chronic and concealed stages when no other means is possible.

In many difficult cases of obscure syphilis at least 2 different tests are better than 1, especially if the Wassermann complement fixation test is done in conjunction with one of the precipitation or flocculation tests. Kolmer believes the mechanism of the Kahn and Wassermann tests are fundamentally the same, but when small amounts of antibody are present, the reactions may vary owing to technical conditions. Despite several strenuous attempts to substitute the Kahn for the Wassermann reaction in serum diagnosis, it is believed the greatest amount of accuracy may be obtained by the employment of both tests wherever possible. Frequent comparisons of the 2 tests are misleading because of the fact that too much emphasis is placed upon a mere comparison or substitution of the Kahn for the Wassermann test, when too little attention is paid to the numerous fine technicalities of the latter test and its several modifications. In physicians' offices and small

laboratories the Kahn test has supplanted the Wassermann reaction because the former does not require complement sheep cells or hemolysin. Where there is a choice to be made between the 2 tests, there is a matter of personal preference, but Dr Kolmer feels the complement fixation test is indicated, because it is less likely to yield non-specific reactions and is much more easily read and interpreted.

Our attention should be drawn considerably to the falsely negative Wassermann report as well as the falsely positive one. This is particularly true in cases of the diagnosis of syphilis in women and children. The strength of the complement fixation or precipitation reaction depends upon the degree of spirochetal activity producing the antibody. The important lesson for the practitioner to learn is never to accept one negative report when the clinical signs and history are indicative of this specific infection. This is particularly so when it is remembered that the amount of antibody responsible for the Wassermann and precipitation tests may fluctuate almost daily within rather wide limits.

Kolmer considers that the valuable time used doing routine urines and general blood studies could be better expended if routine Wassermann reactions were made on all dispensary and ward cases, and on the majority of private patients in the hospitals. Except during the first week or two of the chancre stage, the incidence of positive reactions is certainly high enough according to Kolmer to warrant the routine use of the test.

The lack of attention paid to weakly positive reactions by the physician is

to be deplored. In addition, in many instances, it is not necessary to continue the use of antiluetic remedies where they are contraindicated because of a persistently positive serum reaction, but in Kolmer's opinion, such a condition does mean that the patient is syphilitic and should be carefully watched for the occurrence of a relapse. It is most gratifying to see that persistent treatment has reduced the degree of complement fixation and precipitation to a point that periodic negative reports are obtained combined with an absence of all clinical evidences of infection over a period of years. In contrast, Kolmer states that he has in his practice few cases in which there was a Wassermann fast positive where some evidences of infection might not be found in a combined clinical, roentgenological and serum study. Thus he is convinced that all require observation and periodic courses of treatment to reduce to a minimum the possibility of a clinical relapse.

It is a common observation that many positive serum reactions are the first evidence of a relapsing syphilis the result of insufficient and infrequent treatment. This may occur weeks and months before the clinical signs make themselves apparent. This is especially true in late syphilis. For this reason periodic blood tests at least twice a year for several years are the best means of insuring the physician of the first possible opportunity to detect a relapse following the dismissal of a patient from treatment. The immediate institution of treatment in such cases has in many instances been the means of preventing or at least greatly delaying the development of clinical relapses.

Kolmer believes that every case of syphilis requires at least 1 or 2 examinations of the spinal fluid for a diagnosis and a check on the treatment. In the treatment of all cases of primary and secondary infection, the test should be performed as its results will greatly influence the remainder of the treatment. No study of latent or tertiary syphilis can be complete without a thorough examination of the fluid when it is remembered that from 10 to 25 per cent of cases may show positive spinal fluids with negative blood Wassermanns.

**PATHOLOGY**—Directing attention to the cerebrospinal fluid in syphilis, C H Mills (Brit M J 2 527 (Sept 24) 1927) believes this furnishes the earliest and most accurate indications governing the diagnosis, treatment and prognosis of the condition. In the primary stages, it is surely an advantage from the therapeutic standpoint to know the condition of the cerebrospinal fluid. It should be re-examined after a period not exceeding 6 weeks from the cessation of the initial course of treatment. Thus, this treatment may be regarded as a "therapeutic test." In the earlier cases, the cerebrospinal fluid is frequently the first tissue involved in the attack of the *Treponema pallida* upon the central nervous system. Such a routine test as the reaction of the fluid will surely prevent any subsequent development of meningeal relapses and their sequelæ.

A positive Wassermann reaction in the fluid accompanied by a paretic Lange curve is strong presumptive evidence of a parenchymatous involvement of the central nervous system at this stage. Every case

treated from the outset should have both blood and spinal Wassermann yearly during the first 5 years and subsequently as warranted. Every case of persistently positive blood Wassermann should be subjected to a spinal fluid reaction as considerable cerebral and spinal endarteritis would be prevented thereby if proper treatment were instituted.

Blood Wassermann should be taken routinely in all clinics, regardless of the complaint, and when found to be positive, a spinal fluid reaction should follow. Once the spinal fluid has been found to be positive, it should be examined for many years, irrespective of the fact that the reaction is persistently negative. The old aphorism, "Once a neurosyphilitic always a neurosyphilitic," must never be regarded lightly.

Neurosyphilis, particularly of the vascular type, may progress clinically in the presence of negative findings in the spinal fluid which warrants the assistance to be obtained from the examination clinically by the skilled neurologist. The earlier treatment is instituted, the greater is the chance of preventing a syphilitic involvement of the central nervous system. No patient with a history of syphilis should be given permission to marry without an examination of the cerebrospinal fluid.

A Avramovici (J d'urol 26 5 (July) 1928) believes (1) the kidney inevitably suffers, not only from the disease but also from the treatment. (2) The more or less manifold results of badly tolerated treatment usually appear about 4 years following. (3) The renal lesions due to the elimination of the drugs are most irremediable and frequently an acute lesion

becomes chronic and remains incurable (4) The eliminatory power of the renal filter should be watched cautiously at frequent intervals during the entire course of the treatment. (5) Upon the kidney syphilis may cause anything from a slight and simple urinary disturbance to a complete destruction of the organ (6) A kidney which gives evidence of hypofunction should never be subjected to treatment requiring or causing increased elimination (7) Alternation of the drugs during treatment is the best method of preventing intoxication

**CONGENITAL SYPHILIS** — P. Vernier (Rev fran de dermat et de vénéréol 4 98 (Feb) 1928) states that congenital syphilis of the first, second and third generations has a peculiar predilection for the renal apparatus This is particularly so in the case of pregnancy where albuminuria becomes most marked The treatment according to him is with arsenicals which will cause the albuminuria to clear up usually within three days

Roche (Marseille méd 66 287 (Feb 25) 1929) described what he calls the "flat tongue" of congenital syphilis This he believes is a paralysis of the transverse lingual muscles which results in an inability of the patient to voluntarily curl the edges of the tongue in such a manner as to make a roll of his tongue This he observed in 9 out of 10 cases which he was treating for interstitial keratitis He believes this "flat tongue" is as valuable a sign in congenital lues as Hutchinson's teeth or interstitial keratitis

Considerable interest is always present regarding *reinfection* of syphilis either during or following specific therapy Experimentally, M Truffi

(Gior ital di dermat e sifil 69 372 (June) 1928) chose in his cases on animals the cornea, the tunica vaginalis, and the scrotum for modes of infection He was successful in transmitting the disease in this manner. Also he studied the effects of chemotherapy, particularly bismuth and mercury, and found them both satisfactory

F Bernucci (Gior ital di dermat. e sifil 69 (June) 1928) observed 3 cases, one a man 70 years, another a woman 46 years, and the third, a man of 50 years, all having had the infection for many years By 2 inoculations, approximately 9 months apart, he was able to produce a reinfection It was easily controlled with arsenobenzol

As proof of the syphilitic nature of the superinfection, G A Mestchersky and S Bogdanoff (Urol and Cutan Rev (Apr) 1928) give the following facts (1) The lesions are perfectly identical with the lesions in spontaneous syphilis, (2) they yield rapidly to specific treatment, (3) they do not develop during the course of specific treatment

C R L Halley and H Wassermann (Arch Int Med 41 843 (June) 1928) have made an exhaustive study of all the cases of reinfection since 1910 (during the arsphenamine era) They found 237 cases which have been deemed acceptable for tabulation under the criteria upon which reinfection is judged Of these cases, 98.7 per cent were treated for the first infection during the primary or secondary stages Four cases of second infection occurred in cases in the latent stage at the time they were first treated for the disease A second infection is recorded in 1 case which



presented undoubted evidence of congenital lues. Practically all the cases were treated first before the end of 16 weeks and about 82 per cent before 8 weeks had elapsed. The relative frequency for the second attack of syphilis in those cases which had been treated early for the first infection, as compared with the infrequency of the reinfection, or second attacks, in those patients who were not treated until their infection progressed to a latent or late stage, indicates that the time of treatment for the first infection has an important bearing on the patient's acquired resistance to a second infection. Thus, it may be truly stated that acquired immunity to syphilis may persist in the absence of syphilitic infection or treatment. From the figures studied, the authors were able to definitely state that approximately twice as many patients are treated for the first time late in the course of the disease as are treated early, yet second infections occur 46 times more often in those treated early than in those treated late.

**SYPHILIS, CONGENITAL, IN INFANCY AND CHILDHOOD.—INCIDENCE AND PREDISPOSING FACTORS**—The incidence of congenital syphilis in children varies inversely with the *social standing* of the group studied. R. McBride (Arch Dermat and Syph 18:79 (July) 1928) observed that 3.03 per cent of a group of children of the indigent class in a rural community had congenital lues. In a group of 1000 children of the dependent class, ranging in age from 4 months to 16 years, H. H. Jenks and J. D. Donnelly (Am J Dis Child 37:1198

(June) 1929) obtained a positive Wassermann reaction in 2.3 per cent of the cases, 0.3 per cent of the reactions being the result of acquired syphilis. P. C. Jeans (Pennsylvania M J 33:47 (Nov) 1929) stated that congenital syphilis does not occur as frequently as some would have us believe, even among the class of people where the acquired form is so prevalent. He stated that the incidence of syphilis among infants of the poor class of people is approximately 2 per cent and among older children of the same class, slightly less than 1 per cent.

*Race* has a very definite influence on the prevalence of congenital syphilis. Jeans (*loc cit*) asserted that the incidence of the disease among negroes was several times that among the whites. Jenks and Donnelly (*loc cit*) found that the disease was 4 times as frequent among the colored children in their series as among those of the white race. In the group of cases studied by Jenks and Donnelly (*loc cit*) illegitimacy was not a predisposing agent of congenital syphilis. Although 17.3 per cent of the children observed were illegitimate, only 1 was found to have a positive Wassermann reaction.

Whether syphilis can be *transmitted* to the *third generation* or not is still an unsettled question, nor can it be easily answered, since no means are available for excluding an acquired infection, superimposed upon an inherited one which has become latent or extinct. At least from the point of view of frequency, transmission to the third generation is more of theoretical than of practical importance (Jeans, *loc cit*). Unsettled, too, is the question of transmission of a

syphilitic taint to the infant, without actual infection, leading to structural changes and to the so-called syphilitic dystrophies J Husler and A Wiskott (Ztschr f Kinderh 43 555, 1927) studied 40 congenital syphilitic patients of procreative age It was found that syphilis had remained latent since childhood, although the Wassermann reaction continued positive to a late age The fertility of these patients was not diminished, and the ratio of full term to premature births or abortions was the same as that of non-syphilitic persons The physical and mental make-up of the descendants, 42 in all, was similar to that of average non-syphilitic persons Syphilis as such could not be demonstrated in the third generation nor could a parakinetic injury to the embryo from syphilis That is, an indirect injury due to toxins, was by no means evident, even under conditions of long activity and inadequate treatment

**PATHOLOGY**—Congenital syphilis, according to W C Menninger (Am J Syph 13 527 (Oct) 1929), manifests itself by changes in the pancreas probably as frequently as in any other internal organ This organ usually is increased in size, and is much more fibrous and firm in consistency than normal Microscopically, there is a picture of excessive perivascular connective tissue proliferation with an interstitial distribution The islands of Langerhans escape involvement until very late in the process, and are then affected only indirectly by the mechanical action of the hyperplastic connective tissue The cachexia of congenital syphilis has been ascribed to pancreatic involvement, as have been

acetonuria and acidosis It is probable that certain cases of diabetes mellitus in children result from a congenital syphilitic pancreatitis, but there is insufficient evidence to suggest what the frequency of this cause may be in infantile diabetes

**SYMPTOMS AND SIGNS**—S Way (California and West Med 30 163 (Mar) 1929) concluded from a study of statistics compiled from 326 cases of congenital syphilis, that such minor diagnostic signs as the tubercle of carabelli, frontal bosses, wide spacing of the teeth and alopecia areata, while indicative of some intercurrent infection or nutritional disturbance during early infancy, are of little value in the diagnosis of congenital syphilis, unless confirmed by the Wassermann test L B Dickey (J A M A 90 385 (Feb 4) 1928) believed that the significance of *strabismus* as a symptom of congenital syphilis is not as generally accepted as statistics seem to warrant It was found that 26 per cent of a group of children with late congenital syphilis had evidence of strabismus Because of these findings, the author believed that a blood Wassermann test should be made on every child with strabismus

A case of bilateral, *double pupils*, occurring in a child with congenital syphilis was reported by G Ewan (M J Australia 1 867 (June 29) 1929) The accessory, slit-like pupils were placed just below the moderate sized, normally located ones The accessory pupils reacted, though somewhat sluggishly, to light C Rasch (Brit J Dermat 41 155 (Apr 29) 1929) observed an *unusual eruption* occurring in 2 infants with congenital syphilis The exanthem was

characterized by round, elongated, and band-shaped, slightly infiltrated plaques, which coalesced into irregular reticular lesions. The eruption occurred particularly on the extremities, although in 1 of the infants, the face and nates were also involved. Tissue fluid obtained from the lesions was found to contain the *Spirocheta pallida*.

**NEURO-SYPHILIS**—Jeans (*loc cit*) noted that 39 per cent of all syphilitic white infants studied by him, and 30 per cent of all syphilitic white children over 2 years of age, had neuro-syphilis, as shown by spinal fluid examination. Many of the infections were latent, particularly in infants. The older the child, the greater the chances will be for clinical manifestations of neuro-syphilis. Twenty-three per cent of the white infants, and 55 per cent of the white children over 2 years of age, with positive spinal fluid findings, were observed to have clinical neuro-syphilis. The incidence among colored children showed a very definite contrast to that among white children. Only 23 per cent of syphilitic colored infants had positive spinal fluid findings, and 19 per cent of these had clinical neuro-syphilis. Of the syphilitic colored children over 2 years of age, 12 per cent had a positive cerebro-spinal fluid Wassermann, and of these 13 per cent had clinical neuro-syphilis. In the entire group of syphilitic children over 2 years of age, irrespective of spinal fluid examination, Jeans found clinical neuro-syphilis to be nearly 10 times as frequent in white as in colored children.

The Wassermann reaction is apparently more reliable in congenital syphilis than in the acquired form.

L. B. Dickey and T. L. Sutton (California and West Med 31:242 (Oct) 1929) found that in a group of 103 syphilitic infants and children, the blood Wassermann was positive at some period during the course of the disease in 101 of the patients. In one of the 2 syphilitic infants with negative blood Wassermann reactions, the cerebro-spinal fluid test was found positive. The other infant, manifesting symptoms and signs of syphilis at birth, with negative Wassermann reactions, responded well to anti-syphilitic treatment. Jeans (*loc cit*) stated that nearly 40 per cent of all syphilitic infants have a negative Wassermann reaction at birth. In these, the reaction first becomes weakly, then strongly positive. By 2 months of age, and for several years thereafter, the Wassermann test is strongly positive in all untreated cases of syphilis, and negative in all non-syphilitic children. Jeans has come to believe that syphilis should be diagnosed in children with a negative Wassermann only when the clinical signs are definitely unmistakable. On the other hand, L. Lemez (Ztschr f Kinderh 48:97, 1929) warned against attaching too much significance to a positive reaction in the new-born infant. This author found the test positive in 18 per cent of a group of 271 new-born infants. In most of these cases, the reaction became negative after from 3 to 5 days. In the first 2 weeks of life, both the syphilitic and non-syphilitic infant may give a non-specific Wassermann reaction, according to Lemez. Healthy new-born infants of syphilitic mothers, having a positive Wassermann reaction only in the first 2 weeks of

life, are to be considered as free from syphilis, as long as they remain clinically healthy and their Wassermann tests are negative

**PROGNOSIS**—All cases of congenital syphilis can, as a rule, be cured. Certain exceptions to this statement are found in the high mortality rate in early infancy, resulting from syphilitic infection, and again in those patients, particularly the older children, showing active or clinically latent neuro-syphilis (Jeans, *loc cit*) According to McBride (*loc cit*) a certain number of the patients with neuro-syphilis can be cured, but when symptoms of paralysis have developed, remissions, as a rule, cannot be produced In general, the younger the child, the more readily the response to treatment, and conversely, the older the child, the more resistant the infection will be to treatment (Jeans, *loc cit*) P von Kiss (Jahrb f Kinderh 120 88 (May) 1928) observed that the best therapeutic results were obtained when treatment was administered during the first 3 months of life, the next best results, by vigorous treatment during the first year

**CRITERIA OF CURE**—If the Wassermann reaction becomes negative with treatment, and the patient remains, thereafter, Wassermann-negative and free from any signs of clinical activity, the physician is justified in considering the child cured Jeans (*loc cit*) has yet to observe a clinical or serologic relapse in any child whose Wassermann has remained negative for a year

**PROPHYLAXIS**.—The prophylactic treatment of congenital syphilis is intimately related to the educational, social and medical control of the

transmission of adult syphilis Adequate treatment of infected adults who are potential parents, goes far toward limiting the incidence of syphilis in children **Treatment of pregnant women** with syphilis, not only lessens the number of miscarriages and spontaneous abortions, but also often makes possible the birth of an uninfected infant (Dickey and Sutton (*loc cit*) A group of 250 syphilitic pregnant women was treated by J R McCord (Am. J Syph 12 181 (Apr) 1928) The plan was to prevent syphilis in the infant rather than to cure disease in the mother The treatment consisted in the injection of 0.45 Gm (7 grains) of neoarsphenamine, and the inunction of mercury, weekly, from the time the patient came under observation until the infant was born A serologic study was made of 229 infants born of this group of mothers The reaction was found positive in 42, an incidence of 18.3 per cent Of these, 36 infants had been born of mothers who had less than 6 treatments C H Marshall (J A M A 91 702 (Sept 8) 1928) obtained marked reduction of fetal and infant mortality in syphilitic families by administering specific treatment to the mother during gestation Even in recently acquired syphilis, the chances for healthy offspring were good, with proper antepartum treatment The earlier the treatment is begun, of course, the greater the probabilities for the birth of a normal child This author states that syphilitic women should be treated during each pregnancy S A Gammeltoft (Am J Syph 13 194 (Apr) 1929) concluded from his observations that every syphilitic woman should be treated

during pregnancy (with salvarsan, and mercury or bismuth) without any regard to the date of the initial infection, to a previous intensive treatment or to a negative Wassermann reaction.

#### TREATMENT IN CHILDREN.

—R McBride (*loc cit*) has found that anti-syphilitic treatment administered at short intervals is more effective than that given at the usual relatively long ones. This intensive treatment consisted in giving 3 injections of arsphenamine at 48-hour intervals, and an injection of bismuth at the first and third treatment. The course is followed by a rest period of 6 weeks, during which the patient takes mercury with chalk by mouth.

Intraperitoneal injections of neoarsphenamine were given by C G Grulee, H N Sanford and P. C Waldo (Am J Dis Child 35 47 (Jan) 1928) to 23 children for the treatment of congenital syphilis. Sixteen, or 70 per cent of the children treated, were cured, 4, or 17 per cent were improved, and 3, or 14 per cent died. Of the fatal cases, one patient or 4 per cent died as the result of treatment. Although the intraperitoneal injection of arsphenamine is not without danger if faulty technic is employed, the authors concluded that this method of administration of neoarsphenamine is a rational therapeutic procedure. It is particularly indicated in conditions in which rapid action is required, and the small veins of the child make intravenous injection impossible. J Yampolsky (Am J Syph 13 121 (Jan) 1929, South M. J 22 189 (Feb) 1929) treated a similar group of patients by intraperitoneal injections of mercurosal, as well as neo-

arsphenamine. The dose of neoarsphenamine employed was 0.1 Gm ( $1\frac{1}{2}$  grains) in a 2 cc (32 minims) physiologic solution of sodium chloride for every 15 pounds (7 kilograms) of body weight of the patient. Mercurosal was given as it came in solution, the dose being  $\frac{1}{2}$  grain (0.032 Gm) for every 30 pounds (13.6 kilograms) of body weight of the patient. A course of treatment consisted of 16 weekly injections, the neoarsphenamine and the mercurosal being given alternately, every week. No unusual reactions developed. Absorption took place very rapidly from the peritoneal cavity.

**BISMUTH.**—Margaret L Bronson (Am J Dis Child 36 1136 (Dec) 1928) treated 31 syphilitic children, ranging in age from 2 to 12 years by means of bismuth tartrate with butyn. Regardless of age, 0.1 Gm ( $1\frac{1}{2}$  grains) of the preparation was injected intramuscularly at weekly periods of from 6 to 10 weeks. Bismuth, arsenic and mercury were given in rotating periods of treatment. The bismuth was found effective in the treatment of cases of interstitial keratitis, syphilis of the central nervous system, cases of arsenic intolerance, and particularly those of fixed Wassermann reactions. T M Ling (Lancet 2 1034 (Nov 16) 1929) asserted that it is possible to render serologically negative, a certain proportion of apparently Wassermann-fast patients with congenital syphilis, by means of bismuth, and that its use is not accompanied by any untoward symptom apart from the occasional occurrence of albuminuria.

**MALARIA TREATMENT,** according to Sala Wertz (Monatschr. f

Kinderh 43 255, 1929), when combined with anti-syphilitic treatment, gives better results in cerebral symptoms in children than does mercury or bismuth and arsphenamine treatment alone. She injected 2 or 3 c c (32 to 48 minims) of malarial blood and permitted the children to have from 7 to 17 attacks before terminating the infection. According to Wertz, the treatment is justified in infants with latent syphilis, and positive cerebro-spinal fluid reactions, even when clinical nervous symptoms are absent. It may be begun as soon as the infant has passed the nursing age. W. Wyllie (Proc Roy Soc Med (Sect Study Dis Child) 35 522, 1928) obtained beneficial results with the malaria treatment in a case of *congenital taboparesis*, occurring in a 13 year old boy.

### SYPHILIS OF THE NERVOUS SYSTEM—INCIDENCE—

R. P. Parsons (U. S. Nav. M. Bull. 26 916 (Oct.) 1928) states that in Haiti, where syphilis is perhaps more prevalent than anywhere in the world, tabes and paresis have not been met. He ascribes this to an almost universal infection of the natives with some form of malaria.

Wei Yu Lin (China M. J. 41 698 (Aug.) 1927) confirms previous reports that neurosyphilis, including tabes and paresis, is as common in China as it is in Europe. M. Alurralde and M. J. Sepich (Bull. de l'Office internat. d'hyg. pub. 20 1951 (Dec.) 1928) state that in Buenos Aires the clinical manifestations of syphilis of the nervous system are more frequent and appear earlier, especially in patients who have been treated exclusively with salvarsan or in those who,

after an inadequate mercurial treatment, had subsequently been treated exclusively or systematically with arsenobenzol. Tabes seems to be definitely on the increase, whereas the incidence of latent lues is decreasing. The latter is explained by the systematic use of lumbar puncture whereby forms corresponding to tabes and dementia paralytica *can* be identified in their preclinical stage. F. E. Weatherby (Am. J. Syph. 13 339 (July) 1929) states that there is no evidence that treatment with arsphenamine in the early stages of syphilis predisposes to paresis. In his study of 280 cases he concluded that paresis usually developed in the undiagnosed, neglected and inadequately treated patients. He admits, however, that arsphenamine appears to predispose to early onset of cerebro-spinal syphilis. W. C. Stoner (Am. J. Syph. 12 340 (July) 1928) is also of the opinion that neurosyphilis is less common than formerly.

**PATHOLOGY** — A. Marcozzi (Gior. ital. di dermat. e sifil. 69 604 (June) 1928) reports a case of a baby who died 5 months after birth, a victim of congenital lues. An autopsy revealed the presence of spirochetes in great numbers in a great many portions of the sympathetic nervous system.

F. Wirz (Dermat. Ztschr. 53 726 (Apr.) 1928) in considering the occurrence of an especial neurotropic virus, mentions the fact that many authors advance the argument of the supposed frequency of congenital neuro-lues. However, he has found from an exhaustive investigation that it is not true and feels that the hypothesis of "*lues nervosa*" should be

discarded and other factors for the pathogenesis of meta-lues looked for.

E Brussgaard (Norsk Mag f Laegevidensk 89 1222 (Dec) 1928) reports 473 syphilitic patients, 309 examined from 3 to 40 years after infection, and 164 in whom the cause of death was known. Of the 309, 277 per cent were clinically without symptoms and had negative Wassermann reactions, 148 per cent were clinically without symptoms and had positive Wassermann reactions, 276 per cent had paresis, 127 per cent had tabes dorsalis, and of the 473, 1312 per cent had diseases of the blood-vessels. Grave complications occur even in the secondary stage, diseases of the eyes and ears being most common and most significant in prognosis, frequently indicating meningeal involvement. In the far more important late syphilitic disorders, diseases of the heart and blood-vessels dominate both as to frequency and as to cause of death. It is clearly evident that the organism itself, in a considerable number of cases, has such marked powers of defense that it not only holds the infection in check but may wholly overcome it.

Mabel G Masten (J Nerv and Ment Dis 70 379 (Oct) 1929) reviews the literature and relates her experiences with 20 cases, 10 with general paresis, 2 with optic atrophy and 1 with chorioretinitis. Endocrine disturbance with infantilism was noted in 1 case. Juvenile paresis is unlike the adult counterpart, showing a simple deteriorated child and early delusions of grandeur. The stigmata of congenital syphilis were seen in 11 of 20 cases studied and suggested the diagnosis. Among the

stigmata highly suggestive of congenital lues are included Hutchinson's teeth, saddle nose, sabre-shins, healed keratitis, bone lesions and chorioretinitis. However, none of these signs were present in 9 cases. F R Ferguson and Macdonald Critchley (Brit J Child Dis 26 163 (July-Sept) 1929) also emphasize the importance of search for somatic stigmata, which they found in 80 per cent of cases. In their series a positive blood Wassermann was obtained in 94 per cent of the cases. Congenital paresis was present in 32 per cent of the neurosyphilitic group, tabo-paresis in 12 per cent, tabes in 14 per cent, while the remaining 26 per cent consisted of a heterogenous group of epileptics, mental defectives, hydrocephalus, etc. The authors emphasize a divergence of opinions in regard to the role of syphilis in mental deficiency.

M Faure-Beaulieu (Presse med 36 1539 (Dec) 1928) reports a case of late manifestations of hereditary neurosyphilis in a woman aged 33, with evidences of disseminated involvement of the central nervous system. The spinal fluid revealed a lymphocytosis and an increase in the proteins but a negative Wassermann reaction.

**DIAGNOSIS**—J E Moore (Arch Neurol and Psychiat 21 117 (Jan) 1929), in an extensive study of 81 cases at Johns Hopkins Hospital gives the following summary. Neurorecurrences are found in at least 0.2 per cent of patients with early syphilis. Males are more susceptible to this form of neurosyphilis than females, and white persons more than negroes. An arsphenamine dosage of 0.1 Gm

(1½ grains) for each 25 pounds (11.3 Kg) of body weight for the first 3 injections of the first course of treatment, and the substitution of intramuscular injections of bismuth for injections of mercury in the interim, have apparently reduced the incidence of neurorecurrences in this clinic. The phenomenon of neurorecurrence is limited to inadequately treated patients with early syphilis, it does not appear late in the course of the infection. The type and severity of early lesions do not play a part, apparently, in its production. The treatment preceding the neurorecurrence is always inadequate and usually consists of a few injections of an arsphenamine, without mercury or bismuth. Neurorecurrences are rare after the administration of bismuth. The time interval between the last treatment and the development of a neurorecurrence averages 8 weeks, the extremes being 1 week and 6 months. The spinal fluid at the time of a neurorecurrence usually reacts positively, but does not show anything characteristic. The immediate clinical response to treatment is usually satisfactory except in lesions of the auditory nerve, here the paralysis is frequently permanent. The end-result of neurorecurrences from inadequate treatment showed that 50 per cent developed clinical neurosyphilis, and even after adequate treatment neurosyphilis occurred in 4 of 14 patients. Paresis has been observed in 3 patients following a neurorecurrence. The time interval between infection and the development of late clinical neurosyphilis may be greatly shortened by an antecedent neurorecurrence. The probability of a neurorecurrence can be

minimized in several ways, the most important of which is that the treatment of early syphilis should be continuous without any rest periods until the point is reached when treatment may be finally stopped.

H. I. Schon (Neurol and Cutan Rev, p 661 (Oct) 1928) stresses the importance of spinal fluid examinations for an early diagnosis of neurosyphilis, especially in sporadic, hidden and latent types. He makes the following observations:

(1) Relatively speaking, there are a large number of syphilitics who, in the beginning, have a pathological spinal fluid with a syphilitic meningitis, (2) that this syphilitic meningitis very rarely announces its presence by clinical symptoms, and can only be detected by lumbar punctures, (3) that all syphilitics who, in the initial stage, are liquor positive as well as all who are liquor negative, should be repunctured at regular intervals, e.g., in the third year, even though they give no clinical evidence of syphilis or a lesion of the nervous systems.

The *epinephrine probe test* devised by Much and Essen is described by I. J. Arnsson, L. M. Sachs and N. E. Stein (New York State J Med 29:1199 (Oct 1) 1929). Of 100 patients with neurosyphilis or paresis, with definite clinical and serologic characteristics, 99 showed in the epinephrine probe test the phenomenon of *mucographia alba*. This term is preferred by Arnsson and his associates to *dermographia alba*, the term used by Much. Of 105 patients with dementia præcox, 4 showed mucographia alba limited to one side of the nose. In all 4 patients, the history revealed severe traumas of the skull and in 3 of them, scars with periosteal swellings were evident. The test proved to be most satisfactory and valuable as a means of rapid orientation before the spinal



puncture is performed. The presence of mucographia alba in patients with paresis and patients with neurosyphilis leads the authors to believe that the sympathetic system must also be the seat of certain pathologic conditions.

E C Menzies (Canad M A J 19 427 (Oct ) 1928) reports favorable results from the use of tryparsamine as a provocative agent in the diagnosis of neurosyphilis. In 6 cases which showed a positive blood Wassermann but a negative cerebrospinal fluid Wassermann, tryparsamide rendered the cerebrospinal fluid Wassermann positive.

**COMPLICATIONS.**—H Gougerot reports (Paris méd 1 209 (Mar 2) 1929) 2 cases of epilepsy that occurred in syphilitic patients after syphilis was cured. In the first instance a woman with latent syphilis had daily epileptic attacks which were cured by anti-syphilitic treatment. The attacks reappeared, however, 2 years later and this time were not at all influenced by the antisyphilitic treatment, but were ameliorated with bromides and phenobarbital. The second patient, a man, several years after he was cured (by malaria therapy) of paresis, developed typical attacks of Jacksonian epilepsy which were not modified by antisyphilitic treatment. Both patients at the time of the occurrence of the secondary epileptic attacks had neither clinical nor laboratory syphilitic disturbances and in both antisyphilitic treatment was of no avail. The author, accordingly, believes that the disturbances of the nervous system were caused by scar formation at the site of previous syphilitic lesions.

**TREATMENT.**—The "Lancet" (1-1087 (June 15) 1929) in an editorial summarizes the modern trends in the treatment of syphilis. L W Harrison (Medical Research Council, Special Report Series, No 132 83, H M Stationery Office, 1929) is quoted as stating that the simultaneous administration of **arsenobenzol**, together with **mercury** or **bismuth**, over a sufficiently long period of time, prevented the occurrence of neurosyphilis. However, this does not negative the dictum of Nonne who has always maintained that chemotherapy alone is powerless to prevent the late nervous manifestations of syphilis.

In considering syphilitic therapy, T. W. Murrel (South M J 21 631 (Aug ) 1928) stresses the importance of evaluating the following 4 factors in each case: (1) General condition of the patient, (2) drugs, (3) period of time over which drugs should be used, (4) serology and diagnosis in guiding treatment.

L Karl Sanders (Am J Syph 12 350 (July) 1928), in a discussion of some of the important factors in treatment of syphilis, makes an excellent summary:

1 A few doses of arsphenamine does not cure syphilis in any stage of the disease.

2 Neoarsphenamine combined with mercury or bismuth given over a long period produces excellent results.

3 Regularity in treatment is essential to success. Irregular treatment gives poor results and may be harmful.

4 Iodides in large doses often convert a persistent positive to a negative Wassermann.

5 Early syphilis should be treated intensively and without rest for the first year. Late syphilis with damage in the vital structures should have a preliminary course of mercury and bismuth before administering arsphenamine.

6 **Removal of foci of infection and care of the general health** is an important procedure in the management of syphilis

7 *Patients need encouragement and frankness* to secure their cooperation during the prolonged treatment

8 **Careful periodic health examinations** should be made on all patients who have been under treatment for syphilis

9 When in doubt as to the amount of treatment necessary *a few extra courses are better than not enough*

On the basis of a survey of the literature during the past 5 years and experience with more than 30,000 treatments, Alfred E Jones (Am J Syph 12 374 (July) 1928) draws the conclusion that the choice of antisyphilitic medication should depend upon the peculiar conditions existing in the individual case rather than on the personal preference of the physician. In so far as neurosyphilis is concerned, he stresses the importance of **tryparsamide**, **bismuth** and the use of **foreign protein injections** in *Wassermann-fast cases*. Where intravenous medication is impracticable, as in infants, **sulpharsphenamine** is useful. He regards **mercury** and **iodides** as indispensable in any form of syphilis.

The necessity of *prolonged treatment* in all cases of neurosyphilis is stressed by H. C. Solomon and A. Berk (Am J Syph 12 445 (Oct) 1928). They call attention to those cases of neurosyphilis that do not respond readily and quickly to treatment, but who require a great amount of treatment. In many instances, treatment is stopped long before the stage where benefit is derived and a bad prognosis and outlook result. On the other hand, some cases of a type that ordinarily respond rather readily to treatment may need a great amount of treatment before this can be accomplished. Other

cases, such as paresis, which are often considered hopeless, will at times respond well if treatment is long continued.

Various types of treatment or a combination of treatments may be most satisfactory. This latter point leads to the dictum that no one treatment is to be considered the best, but rather that several are valuable and applicable to any given case. With the methods now available, *i e*, **iodides**, **mercury**, **bismuth**, **arsphenamine**; **intrapinal**, **intracisternal** and **intraventricular treatment**, **tryparsamide** and the **fevers**, many favorable results both clinical and serological are obtainable. In some cases years of treatment may be required and in some cases more than 1 method may be needed to secure improvement.

Solomon and Berk (*ibid*) believe that it is yet to be determined which is the most effective treatment or combination of treatments. They consider that in the vast majority of cases **tryparsamide** and the **fevers** offer the most, therapeutically, although in many cases both may be advisable. Most patients do not seem to develop an intolerance to **tryparsamide** but may receive it week after week uninterruptedly for 2 or more years. **Febrile treatment** may precede or be used subsequent to the other forms of treatment.

Of all agents used in the treatment of syphilis, **mercury** still remains a favorite. L. Spillmann (Bull Soc franc de Dermat et de syph 36 541 (June) 1929) treated a large number of patients who had contracted syphilis 30 or more years previously and who had never been given arsenic or bismuth. Many of these patients had

married 5 or 6 years after infection and have healthy children. They have received treatment ever since, at definite periods, and have experienced no inconvenience other than the necessity of submitting to periodical treatment. In a number of these cases, recent serological tests were uniformly negative. The author feels that the later treatment with arsenic predisposes to neurosyphilis.

**Bismuth** seems to have become a definite institution in the treatment of syphilis and especially of neurosyphilis. That it is capable, by itself, of curing syphilis is reported by S. Nicolau and M. Blumenthal (*Ann d mal vén* 23.161 (Mar) 1928) who report a case of syphilitic re-infection after exclusive bismuth treatment begun in the secondary period. They quote 3 previously reported cases of this type.

The importance of bismuth in syphilis therapy, and especially the rate of absorption as a guide to its employment, is discussed in detail by Svend Lomholt (*Brit M J* 2 887 (Nov 16) 1929). The author emphasizes his preference for intramuscular treatment in an oily solution or suspension at regular intervals. He does not depend entirely upon bismuth but uses it in combination with other agents. David Lees (*Brit M J* 2 298 (Aug 20) 1927) expresses the same ideas during its use in combination with other reagents and also points out that bismuth is valuable in cases of syphilis which are intolerant to treatment by arsenic or mercury and in those cases which have advanced organic disease of the cardiovascular and nervous systems. The relative value of bismuth over arsenicals in

the treatment of neurosyphilis is emphasized by von Kolkow (*Med Klin* 24 503 (Mar 30) 1928).

C. Levaditi and L. Fournier (*Lancet* 1 692 (Apr 7) 1928) endorse the value of the bismuth method of treatment *per os* in all cases of syphilis in which treatment by injection is contraindicated, or in which it is necessary to employ a method of treatment which is convenient and well tolerated by the patient.

L. DeKeyser (*Bruxelles-med* 8 886 (May 16) 1928) reports favorable results in the treatment of 66 cases of syphilis, including a large number of cases of neurosyphilis with colloidal bismuth.

**Bismuth arsphenaminsulphonate** in doses of 0.2 Gm (3 grains), intramuscularly, have been used in early syphilis with gratifying results by P. A. O'Leary (*Arch Dermat and Syph* 18 372 (Sept) 1928). Somewhat similar results are reported in the treatment of 95 cases by J. A. Elliott (*South M J* 22 785 (Sept) 1929).

**Tryparsamide** is of considerable value especially in the treatment of late syphilis. H. C. Solomon (*Ann Int Med* 3 447 (Nov) 1929) states that a conservative summary of the literature of the world covering the results obtained with malarial treatment indicates that a thoroughly poor clinical result is obtainable in 30 per cent of cases of paresis, while approximately another 30 per cent show a reasonable amount of improvement. The results with tryparsamide, while not complete, are substantially the same as those obtained by malaria. Solomon stresses the necessity of long continued treatment in order to procure a serologic

recovery The highest number of tryparsamide injections which he has administered to any 1 patient is 183 in a period of slightly less than 5 years There is rarely any evidence of cumulative effects, or lack of ability of patients to handle the drug

M B Holmes (U S Vet Bur M Bull 5 335 (May) 1929) reports the treatment of 107 patients by intravenous injections of tryparsamide and mercury. Clinically, nearly all the patients improved in general health, some gaining from 25 to 30 pounds In general, the blood Wassermann reaction was affected very little The spinal fluid globulin was slow to change but the spinal fluid Wassermann was materially modified in 30 cases and slightly modified in 17 more The colloidal gold curve was modified in 47 cases Three patients complained of eye symptoms but it is felt that only 1 of these was adversely affected by tryparsamide treatment

E C Menzies (Canad M A J 21 534 (Nov) 1929) reports favorable results by treatment with tryparsamide at Verdun, but stresses the importance of malaria when the latter is practicable or not contraindicated

L G Beinhauer and F M Jacob (Am J Syph 12 61 (Jan) 1928) contend that Wassermann-fast syphilis is due in some cases to a tissue-saturation by the heavy metals used in the treatment, or an arsenic- or mercury-fast spirochete They, therefore, advise intravenous injections of a sterile solution of sodium thiosulphate (0.6 Gm—10 grains) bi-weekly over a period of 5 to 7 weeks A blood Wassermann should be taken after a rest period of 6 weeks During the course of the injections each pa-

tient is given a powder containing 15 grains (1 Gm) of this drug to be taken daily *per os* Following the rest period a routine treatment with mercury or bismuth and iodides is instituted After 6 weeks the blood Wassermann is again taken. Of 28 cases so treated, 24 were serologically improved and 10 became entirely negative While the chemistry of sodium thiosulphate is not clear, it is believed that the sulphur ion is capable of converting the toxic elements such as bismuth, arsenic, mercury, etc., into non-toxic insoluble sulphides in the tissues It is, therefore, useful in acute and chronic metallic poisoning, such as arsenic, bismuth and mercury, in local infiltrations due to faulty technique, as a prophylactic measure against heavy metal poisoning and in Wassermann-fast syphilis

F Pollak (Med Klin 25 671 (Apr 26) 1929) employed sulphur in colloidal form (1 to 2 cc—16 to 32 minims) by the intramuscular route, in 9 cases of metasymphilis The total number of injections was 10 to 12, 2 to 4 days apart In 4 to 6 hours, after an injection, the temperature rose to 100° F (37.8° C) and later to 104° F (40° C), remaining at this height 4 to 5 hours The results were good in all 9 cases and the author concludes that the treatment with colloidal sulphur compares favorably with malaria treatment, at the same time eliminating certain difficulties of the latter

K Schroeder (Klin Wchnschr 7: 1636 (Aug 26) 1928) used sulphur-oil in the treatment of neurosyphilis and obtained good results in 4 out of 7 cases of general paresis, and also in small groups of cases of primary, sec-

ondary and tertiary syphilis. He concludes that sulphur-oil has a definite and markedly specific antisyphilitic action in all stages of the disease, but feels that it should not be relied upon as a sole agent in treatment. He also notes the beneficial effects arising from the febrile reactions, especially in the treatment of neurosyphilis and in pregnant women.

The use of the pentavalent arsenical preparation **stovarsol** has received favorable comment by a number of authors. Thus, Ludwig Levy-Lenz (Urol and Cutan Rev 32 221 (Apr) 1928) reports favorable results from a daily administration of 4 tablets on an empty stomach,  $\frac{1}{2}$  hour before breakfast. This is done every day for a week, stopped for a week, then repeated. Four weeks of treatment and the intervening 4 weeks without treatment are called a "course" and correspond in their effects to about 4 Gm (60 grains) of neosalvarsan. L. Peracchia (Clin y lab 12 89 (Aug), 12 200 (Sept) 1928) also reports gratifying results in all forms of syphilis including neurosyphilis. He uses 2 to 4 grains (0.13 to 0.26 Gm) **stovarsol** by mouth every 5 hours.

C. Levaditi (Acta derm-Venereal. 7 201, 1926) likewise makes favorable comment on the use of **stovarsol**, and quotes Heymann in stating that the daily dose of 1 Gm (15 grains) and a total dosage of 20 Gm (5 drams) is well tolerated.

From an experimental standpoint the employment of immune syphilis serum is not justified, according to H. Reiter (Deutsche med Wchnschr 54: 519 (Mar 30) 1928) and H. Dold and W. Worms (Klin Wchnschr. 7: 2140 (Nov 4) 1928).

H. S. Blesse (J A M A 93: 175 (July 20) 1929) on the other hand, concludes that intravenous therapy is frequently ineffective and that **intraspinal serum therapy** seems to offer patients suffering with cerebrospinal syphilis relief both from the serologic and the clinical point of view. One hundred and thirty patients were treated by the usual method of arsenic, mercury and iodides and of these 100 showed no appreciable change in cerebrospinal fluid. They were then treated by the intraspinal route. Blesse (*ibid*) describes the technic as follows:

The intraspinal treatment was given by administering 0.75 Gm (12 grains) of **neoarsphenamine** intravenously and 5 minutes later 50 cc (1 $\frac{3}{4}$  ounces) of blood was withdrawn from the patient by the open method of introducing an 18 gauge needle into a convenient vein. Blood was then kept at room temperature for 1 hour to permit clotting, after which the clot was freed from the sides of the tube or container with a platinum wire. It was then placed in the refrigerator for 20 hours, after which 15 cc ( $\frac{1}{2}$  ounce) of serum was removed by pipet. If the serum was clear straw colored and apparently contained no red blood cells it was not centrifugated. It was seldom necessary to centrifugate serums if care was taken during pipeting. The serum obtained was then inactivated for 30 minutes in an oil bath at 57° C., after which it was cooled to room temperature. Spinal puncture was then performed with a 20 gauge spinal needle and the 15 cc (1 $\frac{1}{2}$  ounce) of serum was introduced by the gravity method. A glass adapter with rubber tubing connected to a 30 cc (1 ounce) Luer syringe, with the plunger removed, makes an ideal gravity apparatus. After introduction of the spinal needle, the stylet was removed and 12 cc (3 drams) of spinal fluid collected for examination. The glass adapter was then attached to the needle and by holding the syringe below the level of the needle the spinal fluid was permitted to escape into the syringe, forc-

ing the air from the tubing. When approximately 10 c c (2½ drams) of fluid had collected in the syringe the 15 c c (½ ounce) of serum was added and the syringe was then raised to a height approximately 12 inches (30 cm) above the needle and the serum allowed to enter the spinal canal slowly.

Patients with greatly increased spinal fluid pressure denoting meningeal irritation were not given intraspinal therapy, drainage was done and treatment was instituted when the pressure was reduced. Following treatment patients were put to bed for 24 hours with the foot of the bed elevated.

The Wassermann reaction of the spinal fluid collected at the time of the last intraspinal treatment was used for this report. Of the 100 patients that received 2 courses of intraspinal therapy, 28 had negative spinal fluid Wassermann reactions in all dilutions on completion of all treatment, 34 had distinct reduction, 19 slight reduction, while in the remaining 19 there was no change. The author states that only 9 patients failed to show clinical and symptomatic improvement. The remaining 91 patients were distinctly improved.

None of the patients objected to intraspinal therapy but, on the contrary, were enthusiastic and cooperated to the fullest extent. There was not an instance of a severe reaction following or during treatment. It is evident that intravenous therapy influenced the spinal fluid Wassermann reaction in only a small group of patients, while the spinal fluid Wassermann reaction was distinctly influenced by intraspinal therapy.

M. Hecht-Eleda (Arch f Derm u Syph 156 377, 1928) found that the

incubating period of inoculation malaria in 170 patients varied from 7 days in winter to 5 days in summer. H. Ruge (Urol and Cutan Rev 33 8 (Jan) 1929) states that while *early* syphilis should always be treated by arsenic, bismuth, mercury, etc., *latent* syphilis should be treated by malaria to prevent the onset of tabes and general paralysis. On the other hand, that malaria does not prevent syphilis of the central nervous system is stressed by H. Gougerot (Paris méd 1 198 (Mar 3) 1928). As an illustration of the fact that malaria therapy, although effective in the cure of general paralysis, is ineffective in its prevention, H. Gougerot cites the case of a man, aged 39, who contracted syphilis in 1916 and malaria in 1917. The malaria was contracted in the Orient, was very severe, and lasted 2 years. During the second year of the malaria, the patient manifested the first signs of general paresis. Anti-syphilitic treatment caused these signs to disappear. Five years later the signs reappeared, but disappeared again under malaria therapy. The author believes that these facts should be kept in mind by those who advocate that all syphilitics be inoculated systematically with malaria so as to realize a "sure" prophylaxis against syphilis of the nervous system.

C. R. Rayburn and D. W. Griffin (Oklahoma M J 22 389 (Nov) 1929) report their experiences with the treatment of 22 cases in which 119 punctures with intracisternal medication have offered no complaints or complications.

U. Mullern-Aspegren (Acta derm-venereal 7 391 (June) 1926) using the original intraspinal technic of

Gennerich, which involves direct introduction of a neoarsphenamine solution largely diluted with spinal fluid into the spinal canal, reaches the conclusion that **intraspinal therapy** has a definitely favorable influence upon the course of neurosyphilis independent of the collateral treatment employed. He considers the special indications to include (1) *Syphilitic meningitis*, where the infection was contracted more than 1 year previous, or less than 1 year if intravenous treatment has proved to be insufficient, (2) *cerebro-spinal* or *tabetic neurosyphilis* in which there is still a marked meningeal phase. His results in *general paresis* were in the main unsatisfactory but in 2 cases prolonged reduction in the spinal fluid to negative over a period of 2 years was obtained with clinical remission.

H. Planner (Wien klin Wchnschr 40 1512 (Dec 1) 1927) concludes that **myosalvarsan** is almost as effectual as any other anti-luetic agent, that it is less toxic, can be administered intramuscularly and is, therefore, serviceable in children and other individuals in whom the intravenous route is impractical.

J. Vignati (Dermat Wchnschr 88 644 (May 4) 1929) reports the employment of a combination of **copper** and **sodium thiosulphate** with favorable results, the latter being employed as a detoxicant.

W. L. Hardesty (Am J Syph 13 272 (Apr) 1929) uses a **lipoid protein** compound of which the lipoid constituent is a Wassermann antigen and the protein milk. As an adjunct in the treatment of 75 patients representing all stages of syphilis, the im-

provement was satisfactory from both a clinical and a serological standpoint.

J. T. N. McCastor and M. C. McCastor (Virginia M Monthly 55 415 (Sept) 1928) reports, among the other forms of treatment, the use of **Coley's fluid**. He ascribes the favorable results not only to the febrile reaction but to the marked leukocytosis.

The use of **hot baths** is commented upon unfavorably by all investigators. N. W. Hollingsworth (Arch Dermat and Syph 18 736 (Nov) 1928) advises against its use because of the pronounced exhaustion. L. D. Cady and F. H. Ewerhardt (Am J Syph 13 313 (July) 1929) find very little advantage in the use of hot baths as an adjunct treatment in Wassermann-fast syphilis. J. F. Schamberg and Hsien-Wu Tseng (Am J Syph 11 337 (July) 1927) conclude that hot baths alone will be of little curative value in syphilis.

Up to the present time, no definite benefit can be ascribed to the use of **diathermy**, according to the results reported by F. S. Salisbury and W. V. Eichenlaub (U S Vet Bur M Bull 5 432 (June) 1929).

**COMPLICATIONS OF TREATMENT**—From a study of the effect of ultra-violet rays on antisymphilitic treatment, W. Richter (Munchen med Wchnschr 76 189 (Feb 1) 1929) observed that exposure to sunshine and resulting sunburn caused serious complications in patients receiving anti-symphilitic treatment. He advised that treatment be discontinued until the skin, which is concerned with important biologic and metabolic functions, is healed.

R. Bandry (Gaz d hôp (Sept 15) 1928) states that in the use of **arseno-**

benzol the most common accidents are *anaphylactic shock* and *hepatic and cutaneous hemorrhages*. In *bismuth* and *mercury* there may be *stomatitis*, *disorders of the digestive tract*, *neuritis* and *anemia*. The majority of complications following the use of bismuth and mercury are *urticaria*, *fever* and *erythrodermia*. A case of death following administration of *sulpharsphenamine* in syphilis is reported in detail by J. R. Williams and H. E. Pfluke (New York State J. Med. 29 1071 (Sept. 1) 1929).

A case showing marked *monocytosis* is reported by C. P. Wilson (Am. J. M. Sc. 177 88 (Jan.) 1929), presenting an unusual though not new type of reaction to antisyphilitic treatment.

Besides the interesting general reaction of a septic tonsillitis, there was a decided action on the leukopoietic centers, in that a leukopenia was present with a depression of the polymorphonuclears and a stimulation of the monocytes. This type of case cannot with consistency be called agranulocytic angina in the sense that is usually attached to that term. The causative factor is not evident, as arsenic, benzene, and the arsenobenzene preparations occasionally all give rise to a similar picture, but the evidence seems to point to a poisoning by the benzene or arsenic, rather than by the conjugated arsenobenzene compound, arsphenamine. (See also SYPHILIS, CONGENITAL.)

## T

**TABARDILLO.** See TYPHUS FEVER

**TABES DORSALIS.—PATHOLOGY**—G. B. Hassin (Arch. Neurol. and Psychiat. 21 311 (Feb.) 1929), investigated the pathology of tabes in 18 cases and summarizes his observations as follows:

The histologic changes in tabes dorsalis may be classified as degenerative and inflammatory. The degenerative changes involving the posterior columns and the arachnoid portion of the posterior roots are a primary process due to disturbed circulation of the tissue fluids in the spinal cord, especially in its posterior columns. The inflammatory changes occur in the dura and pia arachnoid in which they provoke reactive phenomena. In the dura, they occur as infiltrations with hematogenous elements and vascular changes typical of

syphilis, in the arachnoid, they appear as a proliferation of the arachnoid (or mesothelia) cells. These arachnoid cells are most likely what Richter has designated as "granulation cells", they invade and obstruct the perineural spaces, thus interfering with the flow of cerebrospinal fluid from the subarachnoid spaces. This causes indirectly the phenomenon of stasis in the spinal cord which results in congestion of the spinal cord tissue and the ultimate sclerosis (islands of degeneration) in the posterior columns. The pia-arachnoid changes are secondary to the distinctly inflammatory conditions of the dura and the epidural space with invasion of the subjacent structures, and resulting in changes mentioned in the 2 previous statements. The strangulation phenomena of Obersteiner and Pedlich, Naglotte, Richter



and others are contributory but are not the main factors. Hassin feels that the clinical phenomena of tabes can be better understood if interpreted on the basis of the epidural origin with involvement of the peripheral nerves in the epidural space.

*Tabetic Arthropathy of the Spine*—Eight cases are reported by J. L. Garvey and R. L. Glass (*Am J Syph* 12: 205 (Apr) 1928), all in cases of well advanced tabes in patients between 37 and 58 years of age. In none did trauma to the spine appear to be a factor. There was no pain and the patients were even unaware of the disorder. All the lesions observed were between the 11th thoracic and the 1st sacral vertebræ.

**SYMPTOMATOLOGY.**—M. Sternberg (*Deutsche Ztschr f Nerven* 107: 97, 1928) has observed 12 cases of lobar pneumonia in tabetic patients. The usual symptomatology of pneumonia was greatly modified by the tabetic disease, pain being absent, and also the usual dyspnea, cough and redness of the face.

T. S. Good and K. O. Newman (*Lancet* 1: 765 (Apr 13) 1929) report in a fairly typical case of tabes dorsalis the occurrence of pronounced emaciation within 3 months of the patient's death. At autopsy, there was found a fibrous atrophy of the anterior lobe of the pituitary gland—Simmonds' disease. The authors call attention to the probability that a great many of these cases are overlooked and suggest the use of organotherapy.

Hudelo and Rabut (*Presse méd* 36: 739 (June 13) 1928) call attention to the clinical importance of the occurrence of hematemesis in tabes dor-

salis. This often occurs simultaneously with a gastric crisis, but may occur independently. It may be accompanied by melena, and is sometimes so intense as to cause death.

G. Flatau (*Arch f Nerdauungskr.* 42: 480 (Apr) 1928) cites 3 cases in which the tabetic crisis appeared as a disturbance in some part of the digestive system. In the first case, a woman aged 50, suffered attacks of cramps in the stomach. The regular occurrence of these attacks, together with the fact that no basis for them could be found in the investigation of the gastro-intestinal tract led to a diagnosis of tabes, which was confirmed 1½ years later. In the second case there was a combination of symptoms of tabes and gall-stones. The third case showed only symptoms of pain and tenesmus. After tabetic treatment, the disturbance ceased entirely.

J. Decourt (*Bull méd, Paris* 42: 1292 (Nov 24) 1928) calls attention to certain forms of ataxia in lateral tabes spinalis. These forms appear usually in otherwise healthy patients who, in a few hours, develop all signs of typical locomotor ataxia, the only difference being that the deep sensibility is not altered. The Wassermann test is not always positive but there are pupillary signs and an absence of tendon reflexes. The cerebrospinal fluid reveals lymphocytosis, hyperalbuminosis and a positive benzoin test. With energetic bismuth, iodine and mercury treatment (no arsenicals) a cure is obtained in several months.

P. Carnot (*Paris med* 2: 37 (July 13) 1929) describes a case of sacral tabes dorsalis in which the characteristic syndrome of anovesical inconti-

nence, genital impotence and perineal anesthesia were present. A second case with diabetes, and necropsy findings of a lesion in the terminal portion of the spinal cord, caused the author to conclude that this syndrome is a final stage in syphilis and is particularly resistant to treatment.

T. Alajouanine, M. Bascourret and M. Gopcevitch (Bull. med., Paris 42 1277 (Nov. 21) 1928) and L. Lortat-Jacob and Y. Bureau (Bull. et mém. Soc. méd. d'hôp. de Paris 53 666 (June 3) 1929) report 2 and 1 cases respectively, of trophic disturbances of the foot including perforating ulcers with sympathetic and sensory disturbances analogous to those observed in syringomyelia.

A. Dumas, R. Froment, and Mlle. Mercier (J. de méd. de Lyon 9 303 (June 5) 1928) remark that in tabes dorsalis frequent variations in blood-pressure occur, apart from gastric or other crises. They ascribe these to sympathetic disturbances closely related to the abolition of reflexes that normally permit the heart to adjust itself to the varying conditions of the peripheral circulation. Their views are supported by a similar instability of blood-pressure observed in other diseases of the central nervous system involving the medulla as in syringomyelia. The frequent disappearance of the oculo-cardiac reflex is stressed.

**TREATMENT**—N. Tobias (Am. J. Syph. 12 536 (Oct.) 1928) treated 20 patients with bismarsen with favorable results. Bismarsen is a water soluble compound of bismuth and arsphenamine, readily absorbed by the intramuscular route, relatively free from accumulative effects, and

simple in administration. The arsenic content varies from 12 per cent to 15 per cent and the bismuth from 23 per cent to 25 per cent. The drug is administered in doses of 0.2 Gm. (3 grains) dissolved in 1 cc. (16 minims) distilled water containing 2 drops of 2 per cent butyn solution. Care must be taken that the drug is dissolved completely and injected into the upper quadrant of the buttock, preferably in the inner angle. Of the 20 patients treated with this drug, only 1 developed an abscess, none had systemic reactions or dermatitis exfoliativa. The action of the drug on the kidneys is negligible, and beneficial results were noted, on the average of about 2 weeks after beginning treatment. In all cases the lancinating pains were favorably influenced, the ataxia to a lesser extent, and no effect was noted upon optic atrophy. The blood Wassermann reaction was more favorably influenced than the spinal fluid.

S. Kissóczy and A. Woldrich (Med. Klin. 23 1608 (Oct. 21) 1927) report favorable results through setting up an aseptic meningitis by air-injection into the spinal canal, following Dandy's technic for ventriculography. Of 15 patients thus treated, 10 have shown diminution of the intense pains and gastric crises. Two ataxic patients have been so functionally improved that 1 has resumed his occupation.

J. Wagner-Jauregg (Rev. neurol. 1 889 (June) 1929) considers tabes more amenable to ordinary specific treatment, but believes malaria should be used in stubborn cases. F. G. Ebaugh (J. A. M. A. 91 1020 (Oct. 6) 1928) reports marked relief of lan-

cinating pains in 6 of 15 tabetic patients, who had been resistant to all other methods of treatment. Gastric crises were relieved in 1 patient. D. Paulian (Paris méd 1 231 (Mar 10) 1928) considers the intravenous route of inoculation preferable and stresses the importance of sustaining the heart and keeping the temperature from going too high or remaining high over too long a period of time, by means of drugs which do not influence the parasite. In his experience, the motor disturbances are speedily influenced. The lancinating pains are worse during the febrile attacks, but decrease in frequency and intensity and entirely disappear weeks or months later. The gastric crises are rebellious to treatment and continue sometimes for weeks, but diminish afterward. The reactions in the blood and spinal fluid are modified but not constantly. Nine cases are reported as receiving benefit by the treatment.

A case of tabes dorsalis with coincident diabetes mellitus, treated by malaria inoculation is reported by L. Horvai (Wien klin Wchnschr 41 1123 (Aug 2) 1928). The patient stood the treatment very well although the heart presented some evidence of insufficiency during the second attack of fever. The author concludes that diabetes even in severe form and in old people is no contraindication to malaria treatment.

G. B. Hassin (J A M A 90 605 (Feb 25) 1928), on the basis of his pathologic findings of inflammatory changes in the positive epidural space as well as in the dura itself, reports a new method of treatment. He injects 0.3 Gm (5 grains) of neoarsphena-

mine in 10 c.c. (2½ drams) distilled water into the sacral hiatus about thrice weekly. He regards the method as quite safe and reports favorable results in the treatment of 40 cases. The details of the method are described.

### TESTICLES.—DISLOCATION.

—In a detailed discussion of types and treatment of dislocation of the testes, E. P. Alyea (Surg Gynec Obst. 49 600 (Nov) 1929) reports a case of crural dislocation, the first reported in the literature, due to an accident. An open reduction resulted in an excellent result. There was no separation of epididymis from the testes. The author mentions the various types of dislocations already reported, but states that nowhere in the literature have femoral or abdominal dislocations been reported.

**TORSION.**—A case of torsion of an intra-abdominal testicle is reported by S. Wallerstein (J Urol 21 279 (Feb) 1929), who states that only 7 cases have been reported in the literature, this being the second case in which diagnosis was made correctly before operation and the second case occurring on the left side. Another case in the left inguinal canal is reported by G. J. Feldstein (Am J Dis Child 36 1231 (Dec) 1928).

**TRANSPLANTATION.**—That testes, from monkeys, implanted according to the method of Voronoff into the tunica vaginalis, gave indifferent results in 4 cases is the opinion of L. Schonbauer and F. Hogenauer (Arch f klin Chir 150 333 (May 15) 1928). The authors conclude that the claims made by Voronoff are not justified.

R Demel (Wien klin Wchnschr 41 138, 1928) believes that the results of the implant operation of Voronoff are transient only, due to the absorption of the hormonal substance, as well as by the stimulation of the endocrine system through the transplanted testes. The author thinks that by injecting organ emulsions, the effect of which is likewise limited, the same results may be obtained, and the patient saved the trouble of a surgical intervention.

A report of the condition and structure of testicular grafts, 4 years and 5 months old is given by E Retterer and G Alexandescu (J d'urol 26 113 (Aug) 1928), who found that the central portion, constituting the greater part of the graft, had become necrotic, while the cortex had survived and become vascularized.

**TUMORS**—An *adenocarcinoma* of the testes is reported by A R Stevens and J Ewing (Ann Surg 88 1074 (Dec) 1928). The authors conclude that the tumor is not to be classed with the ordinary embryonal tumors of teratomatous origin, but as an adult anaplastic growth, probably derived from the adult tubule cell.

C C Higgins (Ann Surg 88 242 (Aug) 1928) reports a case of bilateral primary *embryoma*. The same author reports a series of 23 cases of unilateral *carcinoma* of the testes, 6 of which are still alive at varying periods after operation (Ann Surg 87 263 (Feb) 1928).

Another case reported by J H Morris (Arch Surg 15 530 (Oct) 1927) substantiates Ewing's theory of the teratomatous origin of the tumor.

In a review of the literature J. E

Kelley and W C Hueper (Ann Surg 88 1079 (Dec) 1928) state that up to the present time 700 cases of *carcinoma* of the testicle have been reported. The authors mention that malignancy is found most frequently in undescended testicles, especially those in the inguinal region. Metastasis is early and subjective symptoms are rare. **Early operation** offers the only hope. Doubtful cases should be explored. The authors advise the removal of inguinal testicles as a prophylactic measure.

A number of case reports of *sarcomatous tumors* of the testicle are given by H Dew (Surg Gynec. Obst 46 447 (Apr) 1928), who notes that none of the recorded cases has as yet been definitely proven to be sarcomatous. No one has as yet observed metastasis in tumors of this type.

A case of *sarcoma* of the testicle after gunshot injury is reported by Kopas (Med Klinik (Jan 11) 1929). Microscopic examination revealed a tumor formation extending from those portions in which some shot still remained. Death followed from lung metastasis.

Ten cases of *teratoma* of the testicle are reviewed by E J Kilfoy (California and West Med 28 221 (Feb) 1928), who states that if the lesion is strictly a teratoma, the prognosis is much more favorable, but if carcinoma is present, it is very poor. Dismissal of the patient should be accompanied with a request for regular re-examinations every 3 months for the first year, and every 6 months for the next 5 years.

The report of a recurrence of a *seminoma* in the right iliac fossa in a man who, 7 years previously, had

been operated upon for a seminoma of the right testicle, is given by Berger (Bull et mém Soc nat de chir 55 276 (Mar 2) 1929). Four years after operation the patient gave signs and symptoms of an acute suppurative appendicitis. At operation the appendix was found to be normal, but a large fluctuating tumor of the right iliac fossa was punctured and drained, but not excised. The patient recovered in a month and is now (2 years later) in good general condition. Upon pathological examination of a piece of tumor at the last operation it was found to be a recurrent seminoma. The author thinks the recovery of the patient is to be explained by the fact that the evolution of the tumor was checked by the acute inflammation present at the time of the last operation.

In a study made by A. L. Dean, Jr (J Urol 21 83 (Jan) 1929) of the etiological factors in 124 *teratoid tumors* of the testis, direct trauma preceded the tumor formation in 11 per cent of cases. The first symptom in 92 per cent was a painless swelling of the testis. Treatment with external irradiation by means of the **high voltage x-ray** and **radium packs** gave the following results. Of 16 patients who were classified as operable when first seen, 13 or 86 per cent do not have any signs of the disease. Of 97 patients who were first seen and classified as inoperable because of the presence of inoperable recurrences, metastasis or both, 29 per cent do not have any signs of the disease.

**UNDESCENDED.—TREATMENT.**—That the formation of sperm in the testicular tissue is hindered by an increase in temperature, is the

thought of R. J. Harrenstein (Zentralbl f Chir 55 1734 (July 14) 1928). Simultaneous measurements of body warmth carried out in the abdominal cavity and within the scrotum showed a difference of temperature from 3° to 7°. The author advises the **early displacement** of inguinal canal testicles, since the mobility of the testicle is a necessary supposition for the regulation of heat in the scrotum.

Two types of cases of ectopia of testes are discussed by Acquaviva (Marseilles méd. (Apr 15) 1929). (1) Those cases in which the testes are not fixed and can be brought down by **external manipulation**; and (2) where the testes must be brought down into the scrotum by **surgery**. The author advises operation in this type between the ages of 6 and 12 years and thereby avoids possible complications such as neurasthenia, neuralgia, atrophy of the testes, strangulation and hernia.

A case of undescended testicle in a boy 15 years old in whom **Ombredanne's operation** gave excellent results is reported by Ashhurst (Ann Surg 88 131, 1928). This was unilateral. A similar report is made of a case of bilateral undescended testicles in a boy in whom excellent results followed the same operation.

**TETANUS.**—With the gradual decrease in the number of horses in the centers of population, and with the development of modern serum prophylaxis, tetanus is becoming less of a problem. Nevertheless, the consequences of infection are so serious, that vigilance in the prevention and treatment of this disease must not be relaxed.

**ETIOLOGY.**—Tetanus of the newborn has been the subject of recent discussion among pediatricians. Infection is usually by way of the umbilicus. E A Hines (Am J Dis Child 39.560 (Mar) 1930) favors the use of magnesium sulphate and chloral in these cases.

**POST-VACCINAL TETANUS**—This alarming complication of vaccination may be prevented, C Armstrong (J A M A 90 738 (Mar 10) 1928) believes by performing a vaccination which does not destroy the epidermis, and by avoiding shields and dressings.

**SYMPTOMS**—The incidence of tetanus involving the head has been frequently emphasized recently. G V T Borries (Ugeskr f læger 90 900 (Sept 13) 1928) speaks of aural and ocular tetanus, the former frequently associated with an otitis media. This writer and also G Bettazzi (Polisclifico sez chir 43 1 (Jan 15) 1927) calls attention to facial palsies in cephalic tetanus. The paralysis may be either central or peripheral and both types are cited by Bettazzi.

**PROPHYLAXIS**—The early and vigorous anti-tetanus treatment of every suspicious wound is the most effective preventive measure against lockjaw. Persons who are particularly exposed to tetanus, such as gardeners, hostlers, and soldiers, may be vaccinated and given active immunity through a method devised by Zoeller (Arch de med et pharm mil 89 65 (July) 1928). By treating a liter (quart) of toxin with 2 c c of formalin and incubating for a month, the writer obtains a preparation which he calls "anatoxin." It is given hypodermically, 1 c c being administered on the first day, and 2 c c a fortnight later. This dose is repeated

after 4 weeks. These 3 injections, Zoeller believes, will confer permanent immunity against tetanus.

**TREATMENT.**—During the last few years there has developed some controversy about the treatment of lockjaw. There is general agreement that some sort of local treatment is indicated, and that serum therapy is absolutely demanded, but as to the method of administration of the serum there has been some dispute. Many, such as S E Denyer (Lancet 2 119 (July 21) 1928), are in favor of strong intraspinal therapy, while others, notably J M Wainwright (Arch Surg 12 1062 (May) 1926), and R L Harris (Texas State J Med 25 33 (May) 1929), believe it is dangerous and futile. Magnesium sulphate, 20 per cent intravenously, is highly recommended by J Eiselt (Med Klin 24 891 (June 8) 1928) and Hines (*loc cit*), and condemned by Harris (*loc cit*). The use of the serum intracranially is recommended by Denyer and by H Hartleib, the latter suggesting (Zentralbl f Chir 56 130 (Jan 19) 1929) a single subdural intracranial injection of 100 units.

The local treatment of the wound is generally considered of importance. G Leclerc (Bull et mém Soc nat de chir 54 619 (May 5) 1928) describes a patient whose life, he believes, was saved by radical excision of the cicatrized wound. A Arrivat (*ibid*, 54 1071 (Oct 27) 1928) believes local application of serum and, if necessary, amputation of the limb, may be indicated. Harris (*loc cit*) recommends that the site of the wound be opened, that a débridement be performed, and that alcohol, iodine, or potassium permanganate solution be applied locally. He also advocates injecting

10,000 units of antitoxin into the tissues around the wound

A somewhat unusual method of approach is offered by G Spányi (Svenska lak-sällsk handle 54 37, 1928) who withdraws 10 c.c. of the spinal fluid and injects it subcutaneously. A wide variety of general sedative drugs has been suggested. **Magnesium sulphate** has already been mentioned. **Morphine** is considered very valuable by Harris (*loc cit*), and strongly condemned by Wainwright (*loc cit*), the latter believing that it closes the avenues of elimination, he prefers **chlorbutanol**.

Among the less known remedies used in the treatment of tetanus may be mentioned **theophylline ethylenediamine**, H Hoff and F Silverstein (Wien Klin Wchnschr 41 1550 (Nov 8) 1928), **intravenous glucose**, M O Garofeanu and P Tonescu (Compt rend Soc de biol 101 227 (May 24) 1929), **intravenous 10 per cent sodium bicarbonate**, P Heim (Klin Wchnschr 7 794 (Apr 22) 1928), **avertin** and **curarin** E Melzner (Deutsche Ztschr f Chir 212 308 1928), and a program recommended by J Eiselt (Med Klin 24 891 (June 8) 1928), consisting of daily **warm baths**, **intravenous magnesium sulphate**, **sodium salicylate**, and irradiating the wound with **ultraviolet rays**, combined with a **sero-therapeutic regime**.

**TETANY. — ETIOLOGY AND PATHOGENESIS** — This condition is characterized by the exhibition of muscular tremors, spasms, tonic convulsions, and occasionally opisthotonos. All these arise immediately from increased irritability of the nervous system. This is made evi-

dent by the heightened sensitivity of the peripheral nerves to the galvanic current, mechanical pressure over the nerve or tapping. Tetany is, therefore, an expression of an intoxication of the peripheral nervous system of an exciting type. The basic cause is a change in the composition of the fluid bathing the nervous elements. As commonly exhibited, this change is correlatable with an alteration in the state of ionization of the calcium and occasionally with a change towards decrease in the total calcium. Thus, the alkalosis which supervenes on the too free administration of sodium bicarbonate, prolonged forced breathing, chronic obstruction from duodenal pathology, dilatation of the stomach or operations which exclude acid from the stomach may bring about tetany and this because of a shift in calcium ionization, not because of an absolute decrease in circulating calcium. The tendency of the latter state tends to occur when there exists a parathyroid deficiency, when there is deficient calcium as in rickets, when the phosphorus-calcium reserves of the body are drawn upon as in pregnancy. This calcium disequilibrium may be brought about apparently by a wide variety of disturbances and tetany occur.

The *post-operative* tetany following strumectomy is too well known to be due to parathyroid deficiency to need extended comment. Tetany due to diarrhea is on record. It is interpreted as due to altered intestinal permeability for calcium. Tetany following the use of cocaine and epinephrine is not rare. It is possibly a sequence of hyperventilation in nervous patients. The psychic

state of the individual is of consequence, there being on record reports of tetany attacks in patients merely from the shock of changing dressings. Experimental substantiation of this hypothesis is given by the studies of Hammett (*Endocrinology* 6 221 (June) 1922) These showed that tame, relaxed, gentle rats failed to succumb to parathyroid removal, while wild, tense, excitable animals died rapidly of tetanic seizures

Season and age are also factors in the production of tetany in susceptible individuals Early spring months are dangerous times and the young are more prone than the old

**DIAGNOSIS.**—The differential diagnosis of tetany must, of course, rest upon the completeness of the history of the individual patient

**TREATMENT** which aims at mobilizing the calcium to increase in the circulation is obviously indicated in the majority of cases The agent to be used depends upon the etiology In rickets calcium salts, preferably the lactate, viosterol, or ultra-violet irradiation, or all, are indicated In cases where a parathyroid deficiency is suspected, the parathyroid extract, parathormone, produces marked relief when given daily in infant tetany Cod-liver oil and yeast as adjuvants have been found of help In the tetany of hyperventilation or alkalosis, 2 procedures are available one, the administration of acid, designed to reduce the alkalinity and thus change the calcium ionization, the other, the per oral administration of dextrose to relieve the hypoglycemia This therapy is based on the fact that the hypoglycemia of pancreas hyperactivity is frequently accompanied by convulsions which are imme-

diately and startlingly relieved by dextrose

**THERMOTHERAPY.**—The greatest resistance to the inward passage of heat is the skin, but this resistance may be lowered by a combination with moisture, or it may be overcome by moisture plus a higher form of energy which is converted into heat by the resistance of the deeper organs and tissues, states M W Peyser (*Virginia M Monthly* 54 775 (Mar) 1928) The action of heat is manifested by an increased flow of blood, a vasodilatation, whereby the temperature of distant parts may be raised There is increased activity of the heart and lungs, in addition, at high atmospheric temperatures, sweating occurs, more carbon dioxide is thrown off from the skin and lungs, more oxygen is absorbed, and urea, uric acid and other waste products are thrown off in larger amounts because of diuresis For therapeutic purposes, heat may be applied locally or generally

Heat may be applied locally, dry, by means of a hot iron, the hot water bag, frictional massage, either manual or mechanical, the Oudin current through a vacuum tube or metallic brush, diathermy, incandescent electric bulbs, the infra-red rays, carbon ultraviolet lamps, baking apparatus heated by alcohol or gas, or by electric lamps

The *Oudin current*, which is a mono-polar, high frequency current, is counter-irritant when not in close contact with the skin or mucous membrane When administered by means of a vacuum tube, it is used in the treatment of *otitis media*, some nasal conditions, and various vulval, vaginal, uterine, urethral, prostatic, anal and rectal diseases

With *diathermy*, which also is a high frequency current, 2 electrodes are employed During the passage of this current, electricity is stepped down to heat by tissue resistance, and while a large amount is generated at the contact surfaces, the greater amount will be found in the interior of the part treated Diathermy has a place in the treatment of *gout*, *hypertrophic arthritis*, and in *inflammations with calculi*, for it is said to have a disintegrating effect on calcareous substances It is also useful in *neuritis*, *cervicitis*, *endometritis*, *metritis*,



neuralgia, rheumatism, synovitis, prostatitis, etc

Heat produced by *infra-red rays* is next to that of diathermy in penetrative power. Its indications are the same.

Local applications of *heat* may be moist (1) Plain water at the temperature from 101° to 106° F—38.3° to 41° C (2) Medicated water, *e g*, hot solutions of boric acid, etc (3) Poultices

Heat may be applied generally by means of water and vapor baths, plain or medicated, air baths and autocondensation

*Cold* is beneficial in 2 classes of cases, (1) Where it is desired to affect the organs and tissue of the part, (2) where it is sought to lower general temperature, as in hyperpyrexia of typhoid and severe fevers, and sunstroke

In gouty and rheumatic joints, in sprains, and myositis, in tonsillitis and pharyngitis, the *cold compress* affords relief and hastens the cure. The *ice-bag* plays an important part in the treatment of meningitis, encephalitis, headache and delirium, in pericarditis, pneumonia, neuralgias, eye wounds, etc. Excellent results have been obtained in phlegmasia alba dolens by the application of *ice bags* to the affected limb which has previously been wrapped in a *cold, wet sheet*

**THORAX.—PAIN**—Pain in the thorax, states S Pritchard (J Missouri M A 26 579 (Dec) 1929) may arise from diseases of the thoracic wall, such as myositis, osteitis and neuritis. There is a difference between neuritis and neuralgia. Pleural pain may not be due to friction. Tension of the inflamed surfaces may be a factor. Diaphragmatic pleurisy may simulate such clinical entities as gall-bladder disease, chronic appendicitis and duodenal and gastric ulcer. Cardiovascular pain may be divided into retrosternal, precordial and interscapular pain. The site of pain in mediastinal disorders depends on the position of the tumor. Diseases of the spinal cord or vertebral bodies

may cause root pain. It is important to differentiate between neuritis and radiculitis, the latter often being the result of a serious spinal lesion

#### DIAGNOSTIC MEASURES.—

Bimanual compression of the thorax, with one hand on the anterior aspect of the chest and the other pressed over the corresponding area posteriorly, will magnify vocal fremitus so that vibrations may be felt when they cannot be elicited by other methods, according to Savulescu (Bull et mém Soc med d hôp de Bucharest 336 (Nov) 1928)

A direct vision thoroscope has been devised by W Mascher (Beitr z. Klin d Tuberk 71 382 (Feb 22) 1929) which eliminates the difficulties in the division of adhesions in the pleural cavity

**TUMORS**—G J Heuer (Arch Surg 18 271 (Jan) 1929) states that the total number of tumors of the *bony chest wall* reported to date is about 240. Nearly 80 per cent were tumors of the *ribs* and 20 per cent were tumors of the *sternum*. From 60 to 65 per cent were sarcomata, 18 per cent chondromata, and 11 per cent carcinomata. The operative mortality has been reduced from 30 to about 15 per cent, but the late results have not been satisfactory. The results are best in cases of benign tumors

With regard to the *thymus*, the author limits his discussion to the primary *malignant* tumors. The most common of these are the lymphosarcomata, thymomata and carcinomata. Sarcomata arise from the connective tissue elements of the mediastinal lymph glands, thymus, sternum, ribs or spine. The carcinomata other

than those arising from the reticulum cells of the thymus are the result of extension from a carcinoma primary in the lung, trachea, bronchi, breast, esophagus or elsewhere

In discussing *malignant* tumors of the *pleura*, the author reviews the difficulty in the differentiation of these neoplasms. More than 100 have been reported in the literature. They occur in 2 forms: the diffuse and circumscribed. The former appear in the form of multiple nodules or flat elevations which fuse. The *pleura* becomes thickened and eventually is converted into a diffuse, firm opaque mass, covering or compressing the lung. The condition is associated with a bloody exudate. The circumscribed form gives rise to globular tumor masses of varying size which cast a circumscribed shadow in the x-ray film.

Tumors of the *lung* include echinococcus, dermoid and other cysts, *benign* tumors such as fibromata, lipomata, enchondromata, osteomata, angiomas, lymphomata and adenomata, and *malignant* tumors which include endothelioma, carcinoma and sarcoma. Seven hundred cases of primary carcinoma have been reported.

X-ray diagnosis of tumors of the chest is presented by S. Melville (Brit. Med. J. 2: 725 (Oct. 22) 1927), who states that the *fibroma* is a well defined rounded opacity, usually arising from the posterior wall of the thorax. *Teratomata* commonly arise in the anterior part of the chest, they are fairly well defined, though often markedly irregular.

*Carcinoma of the lung* is comparatively common, constituting over 4 per cent of all carcinomata. The

x-ray signs presented by it depend largely on the stage of its development, its location, and the secondary manifestations produced by it. The occurrence of sarcoma as a primary malignancy of the lung is doubtful.

**INTRATHORACIC**—W. S. Lemon (Philadelphia County Med. Soc. (Mar. 12) 1930) states that malignant tumors produce a more rapid progress of symptoms when growing in the chest than elsewhere, because the thoracic walls are not expansive. Since 1925, there have come to the Mayo Clinic more than a hundred malignant growths of the bronchus alone. There is a second group of tumors not in themselves malignant but which cause death by their pressure. There has been much pessimism on the subject of mediastinal growths, but Harrington has on record 8 cases cured by surgery. The tumors found included: (1) Substernal thyroid (which is normal tissue badly placed), (2) a granulomatous type, non-invasive, (3) an invasive round cell sarcoma (symptoms: cyanosis, dyspnea, cough, pain, dysphagia, inequality of pulses), (4) tuberculous tumor, (5) abscess, post-tonsillectomic, with death by strangulation of the lungs, (6) cystic hydroma or lymphangioma causing pressure symptoms, (7) lipoma, 12 cases known, growing to great size without damage, insinuating, slow, with late symptoms therefore, (8) chondromata are elastic, not cellular, have a large, cartilaginous matrix and grow from the second rib, intervertebral disc, larynx or trachea, and may become sarcomatous, (9) myxomata, (10) fibromata, which vary in character and include the neurocytomas, neuroblastomas, ganglioneuro-

mata, neurofibromata, (11) dermoids of which 10 cases were seen, which are difficult of removal, because they are nearly always inflammatory, and (12) carcinomas, which are no longer "rare."

Continuing the discussion, Harrington gave the surgical indications and operative technic. An apparent marked increase in the number of tumors in the mediastinum is probably due to the improved methods of diagnosis. Diagnosis is made by x-ray examination, with determination of the site of the growth and the impairment of respiration. Intratracheal and positive-pressure anesthesia have been found of equal value. Antero-lateral and oblique x-ray films are taken. A bronchoscopic examination is made, and exploratory thoracotomy may be desirable. As there is danger of pulmonary collapse and mediastinal flutter, a preliminary artificial pneumothorax is established several days prior to the operation, and the patient is given 3 liters (quarts) of fluid daily. Ethylene and ether with intratracheal insufflation and with positive pressure is the method of anesthesia, and the lung is ventilated and circulation re-established every 5 minutes. Suction is used for the removal of mucus. The surgical approach depends upon the site. If the tumor is attached to the chest wall, a thoracotomy at the attachment, if in the posterior mediastinum, through a posterior thoracotomy. In 18 cases, the transpleural, one-stage operation was done. *Pleural effusion* is a common sequel of the operation. The aim of the first stage of a two-stage operation is to form adhesions which will wall off the site, but the risk is in-

creased by the danger of effusion. Two operative deaths occurred in the series, on the second and seventh days. The blood-pressure is taken every 5 minutes during the operation, physiologic salt solution being given for a 10 mm drop in blood-pressure, a blood transfusion if the drop in blood-pressure is much greater. The body heat is maintained, and for complicating *dyspnea* and *cyanosis*, the patient is placed in the oxygen chamber. *Pleural effusion*, a late complication in nearly all, requires aspiration. Five of the patients developed *empyema* and were given drainage by the closed method. Of 12 malignant growths, 1 patient died after operation and 7, later, of 12 benign tumor patients, 1 died post-operatively, and the rest are living. There is no relationship between the degree of malignancy and the duration, and the operative results compare favorably with those of malignancy elsewhere. Pain is the most important subjective symptom.

**THROMBOPENIA** —The clinical manifestations of a thrombopenia are, as is known, the hemorrhages occurring in the skin, mucous membranes, etc. Little is known of the fundamental causes of thrombopenia.

P. Demissowa-Ssuscewskaja (*Zent f Gynak* 52 2535 (Apr 29) 1928) studied the effect of the menstrual cycle on a patient with the condition, and found a decided fall in the number of thrombocytes at the onset of menstruation. They rose as the flow continued. X-ray irradiation of the spleen accentuated these differences at the next catamenia. The patient was 47 years old, her first symptoms began 20 years before. The hemor-

rhages were absent during each of her 6 pregnancies and periods of lactation. From these considerations, the authors conclude there is an endocrine sex gland control at work in this patient.

That the hemorrhages, themselves, may be of mechanical moment is shown by K. Evang's (Norsk Mag f. Laegevidensk 89 153 (Feb) 1928) case in which hematomyelia occurred with the succeeding stages over a period of 7 months of flaccid paralysis, spastic paraplegia and extension contracture.

**TREATMENT**—The treatment of the condition is the radical one of **splenectomy**. In W. Anschutz's (Beitr z klin Chir. 142 1, 1928) collection of 100 cases, there was no death from hemorrhage during or shortly after the operation. The general mortality in chronic cases was about 8 per cent. The percentage of cures lasting 6 months was 60. Apparently, differences in the severity of the disease is a factor to be considered. General experience, however, shows that the blood seldom returns to normal permanently.

As a modification of splenectomy, several surgeons have **ligated the splenic artery**. The atrophy of the spleen following this accomplishes about the same purpose.

S. A. Holboll (Hospitalltid 72 841 (Aug 8) 1929) treated a case with **liver extract** with apparent improvement.

**THROMBOPHLEBITIS**.—A case of thrombophlebitis of the *cavernous sinus* and its resultant cure by **operation** is reported by L. Christophe (J. de chir et ann Soc belge de chir 27.312 1928). This condition de-

veloped after 4 months as a complication of caries of the right premolar. The patient had fever, severe shooting pains in the right side of the head, chemosis and exophthalmus of the right eye with blindness from internal hemorrhage. The general condition of the patient was very poor, and under local anesthesia the internal carotid was crushed by a clamp which was left in place. After this, under general anesthesia, the cavernous sinus was opened, through the external wall of the orbital fossa and drained. After 15 days the drain was removed, but the discharge of pus continued for 2 months, after which the patient developed erysipelas which later cleared, with recovery.

Suppurating *sinusojugular* thrombophlebitis treated by the opening of the lateral sinus and resection of the internal jugular, with recovery, is reported by G. Worms and Lacaze (Bull et mém Soc nat de chir 55 138 (Feb 2) 1929). A young soldier, in the course of a severe cerebrospinal meningitis, complicated by bilateral neuritis of the 8 cranial nerves and complete deafness, developed a left otomastoiditis. After mastoidectomy, the symptoms subsided, but 3 days later the symptoms reappeared. A blood culture showed *Streptococcus hemolyticus*. Puncture of the lateral sinus did not bring blood and on incision a brownish clot was removed. On the peripheral side, toward the angle, there was no hemorrhage from the sinus wound. The thrombosis seemed to have reached the gulf and the jugular. The vessel was then isolated and found to be normal as far as the superior border of the thyroid, but at that point a dry puncture was made. The vein was resected.

The mastoid and cervical wounds were left open. Later the symptoms appeared on the right side and likewise a mastoidectomy was done and a lesion found resembling that on the left side. The patient eventually made a good recovery.

Four cases of *otitic* thrombophlebitis are reported and discussed by C. E. Connor (Minnesota Med 11 313 (May) 1928). The author thinks the infection may reach the interior of the anus from the mastoid cells or the thrombophlebitis may originate in small tributaries of the sigmoid. Early, when there is no contamination of the blood stream or disintegration of the thrombus, a **ligation** is considered to be indicated. Ligation should be done only when the ligation can be placed about an apparently healthy vein above the common facial. In severe cases primary jugular ligation is indicated. [Simple **incision** and **drainage** is the safest method of treating any form of septic thrombophlebitis—Ed.]

The *treatment* of the late *complications* of thrombophlebitis of the lower extremities may be anticipated when the relation of the lymphatics to thrombophlebitis is better understood. J. Homans (Ann Surg 87 641 (May) 1928) suggests that new connections between the lymphatics beneath the muscular aponeurosis and the overlying tissues should be made. Strips of deep fascia should be excised beneath areas of superficial edema for some distance above and below them. Badly injured areas should be excised, the muscular aponeurosis beneath being included. Then a skin graft can be placed on the tissues covering the muscles. Experience alone can indicate what

tissues should be excised and what may be treated simply by excision of fascial strips. This is a measure follows the method of Kondoleon.

Experimentally upon dogs, J. Homans and R. M. Zollinger (Arch Surg 18 992 (Apr) 1929) find that it is practical to cause lymph stasis in the hind leg of a dog by an appropriate injury to the principal vein, a portion of the common iliac vein should be included in the trauma. The injury need not be of great violence to cause temporary lymph stasis, but must be severe in order to cause a permanent condition. They believe that the cause of phlegmasia alba dolens is a lymphatic obstruction, due to inflammatory reaction around an area of thrombophlebitis, and that the basic lesion is always in the common or external iliac vein, however far it may extend peripherally.

In a review of 68 cases of acute *localized* phlebitis of the lower extremity, I. Eisenklamm (Wiener klin Wchnschr 42 360 (Mar 21) 1929) declares that all were cured in a comparatively short time by **operation**. In progressing ascending phlebitis, he says operation is often dangerous. In all other cases, surgical treatment gives the best results. Incisions 1 to 2 cm long and 5 cm apart are made following the fissures of the skin in the diseased area. The thrombi are removed with a spoon, but without pressure or scraping. The surgical treatment not only shortens the duration of the condition, but prevents the otherwise frequently occurring relapses. The treatment is, therefore, prophylactic as well as symptomatic. [Venous thrombectomy has a high mortality and in

our opinion is too dangerous to be used—Ed]

In a series of 9 cases, 4 of which died, Laffont, Houel and Ferrari (Bull soc d'obst et de gynec de Paris 17 373 (Apr) 1928) reports the technic of operation for *suppurative uteropelvic* phlebitis as follows

(1) Ligation of the inferior vena cava, (2) ligation of the utero-ovarian veins, (3) resection of the utero-ovarian pedicles, (4) hysterectomy. The chances of success are improved when the blood cultures are negative, the lungs have not been involved, and there is no sign of peritonitis. In non-operative puerperal phlebitis, the mortality ranges from 72 to 95 per cent, whereas in the cases reviewed it was 33.33 per cent.

In a case of *pelvic* thrombophlebitis which terminated fatally, as a result of a pulmonary embolus, 5 days after operation, which is reported by Lemeland and R. Didier (Bull Soc de obst et de gynec de Paris 17 135 (Feb) 1928) the authors feel that the embolism may have been due to insufficient resection of the veins and the fact that the patient's resistance was low on account of a tuberculous infection that was present.

However J. O. Polak (Am J Obstet and Gynec 17 467 (Apr) 1929) thinks that the septic woman is a poor surgical risk and believes operation is not warranted. Any manipulation, bimanual examination, or operation breaks down the protective barriers.

**THROMBOSIS.**—A typical case of *auricular* thrombosis, presenting all the signs of mitral stenosis, auricular fibrillation, cardiac failure, embolism in an artery of the leg, loud cardiac

murmur (noise), pronounced thrill and death, is reported by G. W. Covey, R. Crook and F. L. Rogers (Am J M Sc 175 60 (Jan) 1928). The post-mortem examination showed the presence of a typical ball thrombus occupying the left auricle in the presence of marked mitral stenosis.

A case of thrombosis of the left *auricle*, which came to necropsy is reported by G. Scaglia (Riforma Med 44 1446 (Nov 5) 1928) who concludes that cerebral embolism, associated with other symptoms, has the same significance in the anatomoclinical picture of atrial thrombosis (the Ziemssen-Bozzolo picture) as an embolism of the lower limbs (gangrene).

Two patients who suffered typical symptoms of acute coronary occlusion during life came to autopsy where no interference with the coronary circulation was found. However, in 1 case, a thrombus of the right *auricular* appendage, and in the other case a thrombus of the left *auricular* appendage was found (N. W. Jones and D. W. Baird, Northwest Med 27 469 (Oct) 1928).

Nine patients with *coronary* thrombosis were observed by A. C. Ernestine (Am J M Sc 178 383 (Sept) 1929) from the time of occlusion to death (1 to 4 years). All cases showed the classical symptoms. Two in addition showed pulmonary embolism. The vital capacity of the lungs was studied in 7 cases. All showed marked reduction below normal on admission to the hospital, and in 3 instances the initial reading was 1600 cc or less. Under fluoroscopic examination, there was marked diminution of the cardiac excursion. Electrocardiographic studies revealed

significant features. Three of the cases recovered and are now enjoying satisfactory health. The author finds that a progressive rise in blood-pressure and vital capacity and increasing cardiac pulsations observed fluoroscopically are favorable prognostic signs.

That the thebesian vessels can take up the function of the coronary vessels and supply the heart muscles with blood in cases where the closure is gradual, and thereby allow the patient to recover, is expressed by J. T. Wearn (New England J. Med. 198:726 (May 24) 1928).

In a report of 58 cases of coronary thrombosis, 27 of which are still living, Anderson (Ann. Int. Med. 2:248 (Sept.) 1928) offers a theory for the etiology of angina pectoris, *i. e.*, that it is due to the superficial rupture of the calcareous plaques without the escape of enough tissue fluid to produce thrombosis, but allowing a stretching of the artery wall.

The use of **quinidine sulphate** with good results in a case of coronary thrombosis is reported by S. A. Levine and W. B. Stevens (Am. Heart J. 3:253 (Feb.) 1928). The authors concur with the general belief of hesitancy, but think that its use is justified where the continuance of ventricular tachycardia is hastening a fatal issue.

A case of thrombosis of the smaller branches of the *pulmonary* arteries is reported by C. Frothingham (Am. J. Path. 5:11 (Jan.) 1929). During life, the symptoms were unexplainable. Similarly, a case with obscure symptomatology was found at necropsy by E. Samek (Riforma med. 44:1481 (Nov. 12) 1928) to be primary thrombosis of the pulmonary artery, result-

ing in retrograde embolism into the renal veins.

Thrombosis of the inferior *vena cava* is reported by A. Feller (Wien. klin. Wchnschr. 42:576 (Apr. 25) 1929) with the establishment of a collateral circulation. The patient died of carcinoma of the stomach, with metastasis to the liver, and at necropsy the thrombosis was discovered.

Thrombosis of the *portal vein* is reported in 1 case of A. A. Semetz (Klin. Med. 6:831 (July) 1928), while another case is mentioned by H. Beitzke (Med. Welt 2:938 (June 23) 1928).

The etiology of splenomegaly from the standpoint of thrombosis of the *splenic vein* may be determined by the injection of 1 mg. ( $\frac{1}{6.5}$  grain) epinephrine which causes a contraction of the enlarged organ, according to L. Villa (Med. Klin. 25:908 (June 7) 1929). One case of thrombosis of the splenic vein which, during life, had first been diagnosed as hyperplasia of the spleen but later Banti's disease, is reported by F. Secher and G. Sprohlnle (Deutsches Arch. f. klin. Med. 163:19 (Feb.) 1929).

**ETIOLOGY**—That there is danger of thrombosis of the *peripheral* arteries in the use of intravenous foreign protein in patients with extreme arteriosclerosis, because of the slowing of the rate of flow, is mentioned by A. W. Allen and R. H. Smithwick (New England J. Med. 200:217 (Jan. 31) 1929).

That the increase in thrombosis during the past few years is not due to the increasing use of intravenous injections is the opinion of B. Singer (Deutsches Arch. f. klin. Med. 164:175 (June) 1929).

That increased sensitivity of the

endothelial lining may be due to various factors and hence the formation of thrombi as in the cases following infectious fevers is pointed out by A Dietrich (Munchen. med Wchnschr 76 272 (Feb 15) 1929)

**DIAGNOSIS.**—*Postoperative* changes in the blood stream in which there is a particular intravascular coagulation, and in which there is usually a transformation of the fluid plasma into a state of gel followed by the adhesion of blood platelets to the vessel wall, and later a visible precipitation of fibrin, is discussed by H Heusser (Deutsche Zeitschr f Chir 210 132, 1928), who thinks this is the explainable theory of thrombosis

That the early diagnosis of thrombosis may be made by a blood platelet count, and therefore, prevent the evolution of the thrombus is the opinion of A Kristenson (Acta med Scandinav 70 167 (Feb 28) 1929) after experimental thrombosis in rabbits. A similitude between thrombosis and embolism to the platelet reaction in so far as time relationship is concerned is pointed out by R Y Dawbarn, F Earlam and W H Evans (J Path and Bact 31 833 (Oct) 1928)

A case of thrombosis of the *bifurcation of the aorta* found at necropsy is reported by J de Girardier and P Stricker (Rev de chir 66 97, 1928). The importance of surgical exploration of the bifurcation in doubtful cases in establishing the differential diagnosis and in treatment, the authors believe, is justifiable

**TREATMENT.**—The application of leeches to the site of the lesion as soon as symptoms appear in *puerperal thrombophlebitis* is suggested by

M H G A Tholen (Nederl Tijdschr v Geneesk 1 302 (Jan 21) 1928) and also by Sulger (Deutsche Zeitschr Chir (May) 1929)

The formation of an artificial thrombus above the point of thrombosis, thereby blocking the vein and preventing the thrombi of the varicose vein from traveling farther, is suggested as a method of treatment superior to operation by H Schaefer (Med Klin 25 708 (May 3) 1929)

Nine cases of primary *jugular bulb* thrombosis are reviewed by J L. Maybaum and I B Goldman (Laryngoscope 38 569 (Sept) 1928). The authors feel that prompt surgical interference is imperative, with the minimal trauma. **Ligation** proximal and distal to the thrombus should be done and the sinus **curetted and drained**

Thrombosis of the *hemorrhoidal veins* is treated by F C Smith (Am J Surg 6 352 (Mar) 1929) by putting the patient at rest and on a restricted diet. **Wet compresses of boric acid** are supplied to the area. These should be warm, to comfort the patient and hasten the absorption of the clots. Sloughing may cause a spontaneous cure

Eight cases of primary thrombosis of the *axillary vein* are reported by E P Gould and D H Patey (Brit J Surg 16 208 (Oct) 1928). Treatment given is **rest, elevation of the part and massage** after 2 or 3 weeks. The authors think that rupture of the vein is the most important pathological lesion

**THYMUS.—PHYSIOLOGY.**—Much speculation and little exact information is to be found relative to the function of the thymus. An ex-



perimental beginning has been made in solving this problem by F C Hammett (Abderhalden's Forts d Naturwiss Forschung, new series, iv, 1929) This worker determined the rate of autolysis or cell digestion of the organ at different ages, comparing these values with the weight changes due to growth and involution It was found that with the onset of the involuntary change in weight, there was an increase in the rate of autolysis of the organ *in vitro* This implies that thymic age involution is a self conditioned phenomenon not particularly dependent upon extraneous influences While this demonstrates an age involution, it does not imply that thymic regression as ordinarily observed is due to age as such In fact quite the contrary is the case It is well known that dietary inadequacy, infections, and other disturbing conditions such as thyroid deficiency bring about a tendency to involution of the organ Such being the case, and since no human being coming to the autopsy table has escaped these harmful influences, it is obvious that data as to the time of onset of thymic regression obtained from human pathological material is valueless in the problem of age changes The same holds true for the ordinary run of laboratory animals Hence exact knowledge as to the question of the process is difficult of access Hammett has recorded a set of thymus weights in continuously healthy rats grown under optimum dietary and sanitary conditions These values show definitely that when diet is completely adequate and health is maintained, the thymus shows no marked involution at puberty but

continues to grow thereafter for some time Though it is true that there is a slight recession at puberty, this is recovered from Consequently the common concept that thymic involution is necessary at puberty is no longer tenable That it does so is because of concurrent disturbing influences, not because it is determined by the stage of development as such

It is probable that activity of the adrenal cortex is a factor in the age involution of the thymus when this is allowed to occur in normal healthy individuals This conclusion is based on the fact recorded by H L Jaffe (J Exper Med 44 523 (Oct) 1926) that adrenalectomy retards involution in rabbits, and when done on older animals thymic regeneration frequently follows Further, Hammett reports that adrenal cortex but not adrenal medulla accelerates thymus autolysis *in vitro*

It might be noted that A M Hanson (Minn Med 13 65 (Feb) 1930) reports lytic effects of thymus extracts on tumor tissue *in vivo*

**HYPERTROPHY — SYMPTOMS** —According to C J Bloom (South M J 21 905 (Nov) 1928), the major signs of thymic disease are nervousness, inability of the infant to cry, restlessness, cyanosis, dyspnea, stridor, extreme pallor, attacks of weakness and accelerated breathing Minor indications are a poor appetite, lymphatic involvement, flabbiness, cough, asthma, vomiting, and a familial endocrine history There is much yet to be done before an understanding of the thymus can be had

**TREATMENT** —Turning now to the clinical aspects of the thymus, it is becoming increasingly apparent that when fluoroscopic examination shows

a mediastinal shadow in infants of this organ, prompt x-ray treatment brings about in a majority of cases a reduction in the size of the structure and improvement in symptoms if not a saving of life. Unless the case is unusual and the symptoms require heroic intervention, 1 treatment weekly is enough.

**THYROID GLAND.**—The chief function of the thyroid is the regulation of the metabolic rate through the catalytic action of its specific secretory constituent, thyroxin. When this is deficient, growth is retarded. The growth retardation, however, is not uniform for all the organs of the body. Organs may be separated into resistant, responsive, and special groups. The brain, spinal cord, and long bones are examples of structures the growth of which is not retarded as is that of the body as a whole. They are resistant. The thoracic and abdominal viscera (heart, lungs, spleen, kidneys, pancreas, adrenals, thymus, and liver) are responsive. They not only fail to grow, they even lose weight in acute induced thyroid deficiency. It may well be thought this reaction is a participant in the general growth retardation through a lessening of the availability of ingested food-stuffs. The special cases are the pituitary and the testis and epididymis. As far as the pituitary is concerned this shows enlargement and specific thyroid relation. The lack of growth retardation of the male genital glands in thyroid deficiency is due to the fact that their growth is largely one of growth by increase in cell number, a type of growth which is not directly conditioned by the thyroid. This distur-

tion of differential development results in a definite new structural type of organism. From this F S Hammett (Am J Physiol 82 25 (Oct) 1927), from whose data these pictures are drawn, concludes the possibility that shifts in thyroid activity during phylogenetic development may have been significant factors in the production of varieties within a species, if not of species within a genus. Further findings from these studies were that puberty conditions a particular increase in sensitivity to thyroid deficiency, that thyroid deficiency tends to produce an anhydremia, and a lesser water content of the central nervous system, that females are much more sensitive to thyroid deficiency than are males, and that ossification is definitely retarded.

Histological studies have long suggested that the thyroid subserves some other function than that exhibited by its specific secretory product, thyroxin, for it shows a colloid-storage phase and a secretion phase. Chemical support for this concept is meagre but significant. For instance, it has been found that *thyroxin* does not exert all the effects of whole gland extracts. Further, there is the definitely established pituitary anterior lobe hypoplasia in thyroid deficiency, and the well-known thyroid hypertrophy associated with puberty, menstruation, pregnancy, and the climacterium. These facts indicate an association of thyroid function with other glands of internal secretion which so far are not correlatable directly with metabolic rate. It may be, however, that more intensive investigation will find these inter-reactions metabolically supplementary. For the present, however,

it seems wisest to consider the phenomena resulting from a shift in level of thyroid functional activity as sequels of alterations in basal metabolic rate. In thyroid failure, the pulse rate usually follows the downward course of the metabolic rate as it follows the increase upward in hyperthyroidism.

That the heart reaction to this condition is probably functional and not organic is suggested by the experiments of F. H. Lahey (Ann Surg 90:750 (Oct.) 1929) from which he concludes that there are essentially no thyrocardiac patients who are too decompensated to withstand **subtotal thyroidectomy** without undue risk. Of 101 patients traced and living, 95 have been returned to the full function which they possessed before the onset of *hyperthyroidism*. In this condition the volume of the circulating blood is increased, it is decreased in *hypothyroidism*. These blood changes are in agreement with the water balance findings already noted. Consistent and supporting these phenomena is the fact that the sedimentation rate of the red blood cells is increased in hyper- and decreased in hypo-function of the gland. This is due to the fact that in the former the blood is thinner, in the latter, thicker, because of greater and lesser water content respectively.

It has long been known that the chemical element iodine characterizes the thyroid in the chemical sense because of its singularity of concentration therein relative to the rest of the body. Extensive studies of the type of response of the thyroid to administered iodine in one form or another bring out the fact that proliferation of thyroid epithelium is induced

thereby. An increase in the colloid with compression of the cells is also seen. Prolonged administration produces exhaustion characterized by loss of architecture and cellular disintegration. Regeneration occurs after a rest period. Desiccated thyroid substance produces hypertrophy and hyperplasia of the living cells of the acini.

The symptoms of *hypothyroidism* are generally recognized. M. D. Levy (New Orleans M and S J 81:487 (Jan.) 1929) has added to them the observation that hyperchlorhydria is at times present and that this is relieved by thyroid medication. The condition without myxedema is not rare. R. M. McKean (J Michigan M Soc 28:128 (Feb.) 1929) reports 50 cases out of 2000 reviewed. Distinctive mental and physical fatigue is the chief presenting symptom in most cases, marked by a morning peak, with increasing energy curve as the day wears on, until the crest is reached in the evening. One or a number of the following are also present: Sluggish memory, inability to concentrate, dull headaches, constipation, dyspnea on mild exertion, moderate indigestion, myalgias, arthralgias, disturbed menstruation, which usually is scanty, loss of libido. Low blood-pressure and pulse rate, low buccal temperature and dry skin are frequent. Loss of hair and increasing tendency to dental caries occur, as do a secondary anemia and mild leukopenia with relative mono-nucleosis. Confirmatory, of course is a low basal metabolic rate.

L. Loeb and his co-workers (Am J Path 5:71 (Jan.) 1929) have for years been studying the phenomenon

of compensatory *hypertrophy* of the thyroid. Their recent findings are that anterior pituitary substance, thyroid substance and thyroxin prevent compensatory hypertrophy of the gland and tend to produce changes that imply a condition of rest

Warren H Cole and N A Womack (J A M A 92 453 (Feb 9) 1929) have continued their work on the histological reaction of the thyroid to infections and toxemias. Hyperplasia, loss of colloid, and desquamation are observed. A loss of iodine obtains. The basal metabolic rate rises out of proportion to the fever. The pathologic changes can be largely prevented by the oral administration of iodine. The data support the postulate that the thyroid takes an active part in the resistance of the body against certain toxins and infections.

In conclusion, attention may be directed towards Burhans's review (Surg, Gynec and Obst 47 478 (Oct) 1928) and summary of acute *thyroiditis*. This disorder is characterized by pain over the gland, swelling or tumor formation, tenderness, and fever. In the non-suppurative type conservative measures are indicated. Surgery is always indicated in event of suppuration.

**ACCESSORY ABERRANT THYROID**S are tumors showing the same basic structure of the thyroid, but distant from the latter, and not connected with it. According to Wildenberg (Le Scalpel (Sept) 1928), they occur more often in women than in men and vary in size from that of a hazel-nut to that of fetal head. Usually cystic degeneration occurs. The condition is rare and, as a rule, occurs between the twentieth and fortieth years. Congenital tumors

must not be confused with similar acquired ones, which are entirely separated from the thyroid proper, while the former are connected to it by fibrovascular or parenchymatous stem. The rate of development is very slow. *Diagnosis* is often difficult, particularly in the case of a single tumor, and the growth may be confused with atheroma, cavernoma, fibroma, lipoma, lymphangioma. The size of the thyroid is unchanged with any of these. Frequently these aberrant thyroids only attract attention when they become malignant. *Treatment* is surgical **extirpation** after ascertaining that the thyroid occupies its normal position. Any associated epithelial bodies should be implanted in other parts of the body. The value of operation at the malignant stage has not yet been estimated.

The thyroid develops from ventral median out-pocketing of the pharyngeal epithelium at the base of the tongue. According to certain authorities, the lateral lobes may arise from the fifth pharyngeal pouch. In hyperplasia of the thyroid it is believed that new alveoli developed largely from intervesicular groups of thyroid cells of epithelial type which are present in the gland. These cells are not cell-rests but a reserve of fully differentiated thyroid cells. Accessory or aberrant thyroid tissue in the lateral cervical region, unrelated to the normal thyroid lobes discovered only when involved by pathological condition, probably has an origin other than the mid-line source of thyroid cells, according to A H Tebbutt and V R Woodhill (M J Australia (supp 12), p. 358 (Nov 12) 1927), who report pathological changes of such aberrant thyroid tis-

sue, and conclude that in the earliest embryonic life, the thyroid columns are excessively migratory and establish outlying nodules close to the cervical lymphatics, which ultimately lose their connection with the thyroid gland

**CYST and SINUSES OF THE THYROGLOSSAL DUCT.**—These arise from an abnormality of the development of the duct following the descent of the thyroid gland. When the duct fails to close completely and the foramen cecum fails to remain open, a cyst is formed by the retained secretion which is always in, or near, the median line

In the technic used by W. E. Sistrunk (*Surg. Gynec. Obst.* 46:109 (Jan.) 1928) for the removal of these cysts and sinuses, the course of the sinus tract is outlined by injecting a solution of methylene blue. The cyst is then exposed to a longitudinal incision and dissected free from the hyoid bone, from the center of which a small segment is removed. The foramen cecum is then located, and the duct and surrounding tissues are removed from below upward to the foramen. By this method the risk of fragmentation of the duct with a retraction and loss of fragments and a resulting secondary recurrence of the cyst, or sinus, is obviated.

**FETAL ADENOMATA**—These growths, according to A. E. Hertzler (*Arch. Surg.* 16:1187 (June) 1928), resemble in structure the undeveloped gland. They have a uniform, ovoid shape and a division into reticulus-like pyramids, often with central zones of fibrous tissue and a definite encapsulation. Their source is unknown. Clinically, they are most commonly seen in young per-

sons and are then no larger than hazel-nuts. Usually, solitary, they are often the only thyroid lesion. The adenomata are freely movable and are not influenced by medication and, ultimately, their removal will be necessary. An objection to their removal in young persons is that a true goiter may develop later, which will be looked upon by the patient as a recurrence. In the first half of life, if they become toxic, the toxicity is not extreme, and the eye signs are never produced. In middle life, as the danger of late heart degeneration and, particularly, the development of malignancy is ever present, the removal of tumor is to be urgently recommended. The tumors may also attain considerable size and undergo secondary degeneration. Hemorrhage occurs into them and in some cases the sudden augmentation in the size of the tumor may quickly cause suffocation. The fibroid tissue is prone to undergo a characteristic keloid-like proliferation and mucoid degeneration. The acini may develop colloid and later undergo the changes of an old colloid goiter in its immediate proximity, leading to toxicity which never reaches the degree of a true exophthalmic goiter.

Thyroid adenomata are divided into (1) True, interstitial or fetal and (2) pseudovesicular or colloid nodules. Fetal tumors occur in young subjects and are hard encapsulated bodies, either single or multiple. They are true blastomata. Colloid nodules occur in older women and are always multiple and are not true blastomata, according to L. Rogers (*Am. J. Surg.* 5:265 (Sept.) 1928), but degeneration nodules, which become encapsulated by a

process of vesicles distended with colloid, in groups, intervening between which, other vesicles are compressed and distorted, and ultimately form capsules around each of the growing nodules. Either variety of adenoma may become cystic. Adenoma parenchymatous goiter is very common and almost invariably occurs in women.

**TUMORS**—In a clinical study of 457 cases of *malignancy* of the thyroid gland, J de J Pemberton (Ann Surg 87 369 (Mar) 1928) found the following: Sarcoma 1 per cent, diffuse carcinoma 25 per cent, carcinoma in fetal adenoma 38 per cent, papillary adenocarcinoma 30 per cent. In only 35 per cent of the operated cases did the clinician suspect the malignant nature of the tumor. The surgeon suspected it in 69 per cent. Metastasis occurs frequently and often early in the course of the disease, through the lymph and blood. Secondary involvement occurred as follows: Regional nodes 69 per cent, lungs 24 per cent, chest (mediastinum) 16 per cent, bones 6 per cent. **Operation**, supplemented by irradiation, is the treatment of choice. The *adenoma* must be viewed as the precursor of the malignant condition, although the danger entailed by the retention of an adenoma is not over 27 per cent.

In the study of 90 malignant epithelial neoplasms of the thyroid, F A Collier (J A M A 92 457 (Feb 9) 1929) found that they comprised 4 per cent of all endemic goiters. Histologically, 28 per cent were medullary carcinoma, 66 per cent adenocarcinoma and 5.5 per cent scirrhous carcinoma. A large number of adenocarcinomas were confined to

adenomata. These should be considered true early carcinomata of the thyroid. A history of a pre-existing goiter was present in 75 per cent, and microscopic examination showed evidence of its origin from some type of endemic goiter in all except 1 instance. This exception arose from a hyperplastic gland of an exophthalmic goiter. Of the patients 72.2 per cent were females, 27.8 per cent males, the same ratio that exists in the total number of endemic goiters. The age varies from 14 to 72, with 34 per cent occurring before 40, and 56 per cent between the ages of 40 and 60. The leading symptoms were those associated with hyperthyroidism, next in frequency were pressure symptoms, while rapid growth was noted in only 15 per cent. An abnormally high basal metabolic rate was observed in 46. Correct pre-operative diagnosis was made in only 25 per cent, while in 47 per cent the true diagnosis was unsuspected. Collier concludes that *adenoma* of the thyroid is a pre-cancerous lesion with a small but definite incidence.

In the **diagnosis** of the *malignant* thyroid, the most difficult clinical differentiation is that between thyroid malignancy and chronic diffuse thyroiditis. In the latter case, according to E M Eberts and R R Fitzgerald (Ann Surg 86 515 (Oct) 1927), there is a dense, uniformly hard swelling of moderate size which is usually unilateral at first, but soon involves the entire gland. The surface of the gland remains smooth and the normal shape is retained. The patient shows an early waxy pallor of myxedema.

In discussing Collier's paper, Simpson (J A M A 92 457 (Feb 9)

1929) reported that in a study of 1449 thyroid glands there were 55 cases of malignant disease, including 50 carcinomas and 5 sarcomas. In no case was a carcinomatous transformation found in a true exophthalmic goiter. In 60 per cent of the cases the carcinoma was unrecognized clinically, and 28 of the 55 cases had hyperthyroidism and 5 exophthalmos. The great majority of the patients had an adenomatous colloid goiter, although many writers have emphasized the fact that thyroid carcinoma most frequently originates in a fetal adenoma. Only 5 of these cases thus originated.

Coller (*loc cit*) divides *malignant* tumors into 4 types: (1) Carcinoma solidum, (2) carcinoma medullare, (3) carcinoma adenomatosum, and (4) carcinoma scirrhosum. Types 1 and 2 are usually diffuse and give metastasis early, often through the blood to the lungs and bones. The majority of patients do not survive the 3-year period. In type 3, the acinar sinus structure is still evident and usually the neoplasm clearly originated in an adenoma which might be of any type. About one-third were the diffuse infiltrative types, while the remainder were confined to a single adenoma. In the diffuse type, metastases were common, appearing somewhat later than with carcinoma medullare or solidum. Blood-vessels were frequently invaded with the formation of tumor thrombi and, at times, the regional lymph nodes were massively involved. Malignant adenoma—adenomas which contained neoplasm which cannot be diagnosed clinically as carcinoma—often recover after excision. After a 3-year period, 40 per cent are

dead from recurrence or metastasis. Only 5 cases of type 4, or carcinoma scirrhosum, were observed, the growth is slow. All of these patients still remain alive, with recurrence in 1, but all are still in the 3-year period. Other forms, such as squamous carcinoma and carcinoma mucosum were not encountered in this study and it is probable that they are not primary in the thyroid but arise in teratoid structures, such as branchial arches or thyro-glossal duct.

*Treatment*—According to Pemberton (*loc cit*) the results from the surgical treatment for carcinoma of the thyroid are more encouraging than is popularly believed. Of 204 patients operated upon at the Mayo clinic, 32 per cent were living after a lapse of from 3 to 18 years. Of those with *sarcoma*, none were alive, with *diffuse carcinoma*, 21 per cent, with *carcinoma* and *fetal adenoma*, 38 per cent, with *papillary adeno-carcinoma*, 48 per cent. In the cases in which malignant disease was diagnosed before operation, 32 per cent of the patients are living 3 years or longer. Metastasis occurs through the lymph and blood, frequently, and often early in the course of the disease. The most frequent site being regional nodes 69 per cent, lungs 24 per cent, chest and mediastinum 16 per cent, bones 6 per cent. **Operation** should be supplemented by the use of **irradiation**.

H. H. Bowing (Am J Roentgenol 18: 501 (Dec.) 1928) gives tabulated details of 167 cases of *malignancies* of thyroid treated by **irradiation** alone or by **surgery and irradiation**. Of 91 patients in the group operated upon, 56 are apparently cured, and 9 definitely improved. Of 76 patients in

the inoperable group, 58 are dead, palliation was all that could be hoped for and this occurred in varying degrees: 40 patients were improved, 6 did not improve, and death occurred within a short time. Among the inoperable group treated by irradiation alone, 14 patients are alive after 3 years and 8 are alive after 5 years. About 10 per cent of these patients have lived longer than 6 years and are apparently free from active disease, although they have not received treatment for years.

A review of the literature and personal observations leads S. Ginsburg (Arch Int Med 44 73 (July) 1929) to conclude that surgical intervention is no longer the only means of relief in dealing with *toxic adenoma* of the thyroid. Radium therapy, safe, efficient, free from surgical risk, deserves first choice, not only in dealing with exophthalmic goiter, but also in the treatment of adenoma of the thyroid. To obtain the best results in treatment of *toxic adenoma* of the thyroid, as well as in *exophthalmic goiter*, a combination of radium therapy plus rest in bed, proper medication and diet is highly desirable.

A. Soland, W. E. Costlow and O. N. Meland (Strahlentherapie 32 131 1929) call attention to the fact that, as the cause of exophthalmic and toxic goiter has not been definitely established, a strictly specific curative treatment is not known. However, as the surgeon is able to obtain a cure by partial extirpation of the hyperfunctioning gland, it may be assumed that irradiation will give the same result, since it diminishes the secretory cells within the gland tissue. On the basis of this assumption, the authors made an extensive

investigation of irradiation therapy, sending a questionnaire to 300 leading radiologists in this country and abroad. The conclusions reached are as follows. In toxic goiter, of 3185 patients treated, 73 per cent were cured, 16 per cent were benefited, and 11 per cent were not benefited. The results are, therefore, comparable to those of surgical intervention. Failures are due to lack of cooperation on the part of the patient, lack of radiosensitivity of the goiter, and improper selection of cases. Improvement in the result is to be expected with improvement of the technic.

Radiation is of great value in *malignancy* of the thyroid. Seabrook found that it gives as good a result as total thyroidectomy and is not followed by tetany. U. V. Portman (J. A. M. A. 89 1131 (Oct 1) 1927) found that of his patients treated by a combination of operations and x-ray, 182 per cent were clinically cured, and a like number were living and clinically well 4 to 5 years after treatment. This indicates the possibility of effecting a cure in 36.5 per cent of cases treated by the combined method. The results obtained from the author's series indicate the advisability of applying irradiation in every case of malignant disease of the thyroid gland. The explanation of this observation may lie in the fact that apparently the cellular structure of many malignant growths of the thyroid are sensitive to irradiation therapy because of their fetal or embryonic origin, and because metastases must take place through small blood-vessels or lymphatics which are also comparatively susceptible to irradiation.



After thyroidectomy for cancer, S. O. Portugaloff (Ann Surg 90 37 (July) 1929) transplanted a goiter from a patient with compatible blood, anastomosing the superior thyroid artery of the transplant to the patient's inferior epigastric artery. This was followed in a fortnight by disappearance of the symptoms of myxedema, but after 6 months, metastasis of the cancer to the liver was suspected. A course of x-ray treatment was used and in a few weeks all the symptoms of myxedema returned. At a second transplantation it was found that there was no evidence of thyroid tissue, which had been transplanted seven months before, even under microscopic examination.

**SURGERY OF** — Medicine and surgery have combined to achieve a great triumph in the treatment of goiter particularly the type associated with hyperthyroidism. Without this cooperation, the present satisfactory status of goiter management would have been impossible.

One of the most important advances in the treatment of *exophthalmic goiter* was the use of Lugol's solution, as a preoperative measure, by Plummer in 1922. This medication alone has reduced the mortality at the Mayo Clinic from 3 to 1 per cent.

De Courcey, Marine and others attribute the beneficial effects of iodine medication in Graves's disease to rapid accumulation of colloid substance in the alveoli, producing a pressure retention. This prevents the escape of toxin until the thyroid cells have accommodated themselves to the increased tension. When this

occurs, there is again an escape of toxin with a return of symptoms.

Persons with toxic goiter who receive the iodine treatment, show a rapid improvement in a few days. The basal metabolism rate may fall from plus 50 or 60 to plus 10 or 20. At the same time the pulse rate becomes slower, the appetite improves, weight increases, and the nervous symptoms and tremor diminish. Unfortunately the improvement under medical treatment is only temporary. When it is discontinued or continued beyond the peak of *amelioration* of symptoms, the condition relapses and may become worse than ever. The chief value of iodine, therefore, is to gain a brief remission in the course of the disease, and operate at the most favorable time, *i e.*, when toxic symptoms are at their minimum. This is believed to be in about 10 to 14 days with the use of iodine.

It may be of interest to mention the pathologic changes following the use of iodine, which are described by Rankin as follows: "The action of compound iodine solution is characteristic both grossly and microscopically. Prior to the administration of this agent exophthalmic goiters were vascular, bloody, friable, and from a technical standpoint, difficult of removal in many instances. Adequate iodination reduces this state to one markedly resembling diffuse colloid goiter. There is an increase in the amount of colloid, in the connective tissue, and the size and regularity of the acini. There is a decrease in vascularity, a decrease in the height of the epithelium, a decrease in cytoplasmic bodies in the epithelial cells, and a decrease in mitosis and lymphocytic infiltration. With these changes,

the friable gland becomes easy to handle at operation, and grossly appears lobulated and reddish, with a characteristic meaty surface, it has lost its fragility and much vascularity."

Rogers, in relation to the use of iodine in the *toxic adenoma*, states "The belief is rather commonly held that toxic adenoma and the exophthalmic goiter are 2 separate and distinct diseases, although the toxic manifestations are essentially the same. This belief has found some support in the general view that iodine may be harmful in the adenoma cases, while it is frequently beneficial in the exophthalmic cases." J. B. Youmans and R. H. Kampmeier (Arch. Int. Med. 41: 66 (Jan. 15) 1928) report careful observations on a series of 30 unselected cases of toxic adenoma, on whom complete data could be obtained. Of these cases, 80 per cent showed a response to the administration of Lugol's solution, similar to that observed in exophthalmic goiter and equally favorable. In no instance were toxic signs and symptoms produced in the adenoma cases except where the administration of iodine was unduly prolonged. The use of iodine lowered the basal metabolism rate from 20 to 100 per cent, and in this respect the results were almost identical with those obtained in a like number of patients with exophthalmic goiter. From their own experience, they state that it is improbable that the administration of iodine ever causes toxicity in non-toxic adenomatous cases, no matter what doses of the drug are employed. As a result of their observations, they believe that there is no essential difference in the pathogenesis of toxic adenoma and exophthalmic

goiter, at least none that is evident from the response to the administration of iodine.

In the past few years there has been a definite change in the mode of performing **thyroidectomies**. This seems to be universal. Formerly a high percentage of cases with *exophthalmic goiter*, more than a third, were operated upon by such graded processes as lobectomy, single or double ligation, 2-stage thyroidectomies, the injection of boiling water, etc. The disregard of many of these procedures, almost to their abandonment, has resulted since the routine use of iodine.

The operation of choice at the present time is a **subtotal thyroidectomy** performed at one operation, following careful **preoperative** preparation with **iodine**. At the Mayo Clinic, the operation of choice is the subtotal thyroidectomy which includes a resection of a portion of both lobes, and removal of the isthmus, leaving a portion of the posterior surface of the gland on either side, to protect the blood supply to the parathyroid bodies and lessen the danger of injury to the recurrent laryngeal nerve. The essentials of any thyroidectomy are: (1) The removal of an adequate amount of glandular tissue, (2) avoidance of injury to the inferior laryngeal nerve, (3) accurate hemostasis, (4) avoidance of injury to the parathyroid bodies, and (5) consideration of a satisfactory cosmetic result.

Subtotal thyroidectomy performed during the iodine stage of remission by an experienced surgeon, carries with it but slight operative risk, if instituted before permanent damage to the circulatory apparatus has occurred. Under these circumstances, exophthalmic goiter may be cured or,

at least, controlled. The signs and symptoms should disappear and the basal metabolic rate should drop to normal following a subtotal thyroidectomy, otherwise an insufficient amount of the gland has been removed.

The only conditions recognized by Rankin for multiple stage operations are extremely bad risks which are obviously the result of long standing hyperthyroidism or general constitutional ailments, local causes such as large goiter deforming the trachea and causing obstruction, cases in which operation has to be abandoned after resection of 1 lobe because of some technical complication, such as injury to nerves or hemorrhage which is accompanied by sudden change in the patient's condition, with a lowering of the surgical threshold of safety.

In relation to the surgery of cases of *toxic adenoma* Frazier states that, in his experience, cases of toxic adenoma do very poorly under medical treatment, and surgery is the only means of cure. He considers nodular enlargements of the thyroid surgical cases, whether they are toxic or non-toxic. All nodular enlargements are potentially malignant and Smith and Clute report 94 per cent of their malignancies of the thyroid as having occurred in people who gave a previous history of adenomata. In general, it might be said that there are no contraindications to surgery in toxic thyroids, except when the prognosis of the complicating factors (*i.e.*, visceral damage as the result of a prolonged untreated case) is such that surgery directed at the thyroid would not prolong the life of the patient.

A recent method that has been employed with success in the treat-

ment of *exophthalmic goiter* is **cervical sympathectomy**. In this connection R C Shaw (Brit M J 1 495 (Mar 16) 1929) states that exophthalmic goiter has been treated surgically by operation on the thyroid gland directly, and operation on the sympathetic indirectly. Both types of operation have yielded amelioration of the symptoms or a cure. Chahier, in 1926, reported a series of 19 cases of cervical sympathectomy for toxic goiter, with the following results: 3 cured, 9 greatly benefited, 6 slightly benefited and 1 recurrence. The effects of a cervical sympathectomy may be noted as follows: (1) Immediate increase in signs and symptoms, (2) decrease in the basal metabolism rate and a diminution in hand tremor, (3) general amelioration of all symptoms. Examination of the extirpated ganglia showed granular degeneration and atrophy of the nerve cells, an increase in connective tissue and hyperpigmentation. Shaw considers cervical sympathectomy suitable in all cases in which cardiac decompensation or derangement prevents direct thyroid surgery.

The **POST-OPERATIVE COMPLICATIONS** of thyroidectomy are of paramount importance, especially since at the present time more attention is directed towards morbidity rather than mortality, this giving an index as to the advantage of one form of treatment over another. The various complications and their prevention may be enumerated as follows. The first is *hemorrhage*. The patient should be allowed to awaken and strain to see if any bleeding points have been neglected. Second, mild and transient post-operative *tetany*, due to the removal of 1 or

more of the parathyroid bodies, which may be controlled by the administration of calcium intravenously and Collip's parathyroid extract subcutaneously. This complication is rarely seen at the present time. However, recent anatomical investigations have shown the presence of accessory parathyroid glands which may unavoidably be removed in the course of the resection of the thyroid gland. In these cases, if discovered, F. H. Lahey (New England J. Med. 200:909 (May 2) 1929) advocates their transplantation under the left border of the sternocleidomastoid muscle. Experimental evidence of the efficacy can be quoted. This complication, however, is rare, Eiselberg reporting but 6 instances of tetany in a series of 2373 cases. Third, *injury to the recurrent laryngeal nerve* may often occur. This complication may be avoided by leaving the posterior surface of the thyroid gland intact. However, C. H. Fowler and W. A. Hanson (Surg. Gynec. Obst. 49:59 (July) 1929) have shown that in many cases the recurrent nerve does not pass posterior to the surface of the thyroid gland. The best method to avoid injury to the nerve is to allow the patient to react from the anesthetic while manipulations are being made in the vicinity; a conversation may be carried on with the patient and any evidence of aphonia noted immediately. Crile has shown that recurrent nerve injury may often be due to pressure edema, the nerve may be caught in scar tissue, pressure of malignant growths, finger pressure or pulling on the nerve when the gland is rolled out. This injury should be carefully avoided as anastomosis in most cases has been

a failure. C. H. Frazier (J. A. M. A. 83:1637 (Nov. 22) 1924) has tried anastomosing the recurrent laryngeal with the descendens hypoglossi nerve in 5 cases without success. Fourth, *embolism* has been observed as a complication. D. B. Seabrook (Northwest Med. 28:111 (Mar.) 1929) agrees with Lewis that the emboli are the small clots which are formed, during the marked stagnation of the blood, in the auricular recesses of a poorly functioning decompensated heart, and dislodged into the general circulation with the improvement of the heart action. *Pneumonia* has often been noted as a post-operative complication, but has now become a less dangerous condition since the use of the oxygen tent. *Hypothyroidism* of a mild degree may occur, this is overcome, however, in 3 to 6 months by the use of thyroid extract. Richter states that this is to be desired, for it definitely assures against failure to accomplish the surgeon's purpose, *ie*, permanent relief from thyrotoxicosis, indicating that sufficient of the thyroid gland has been removed. To quote this writer: "The thyroid is essential to the existence of the thyrotoxicosis, a sufficiently radical thyroidectomy must necessarily end the intoxication. Residual organic damage may remain, but not active intoxication." *Hyperthyroidism* may be serious, indicating insufficient removal. It may be controlled by Lugol's solution and further operation.

In conclusion it might be said, that pre-operative iodination has resulted in a great change in the mode of treating hyperthyroid cases, both medical and surgical, and has brought about a great reduction of mortality.

Surgically, subtotal thyroidectomy performed at one operation has superseded the former graded processes and multiple operations. There have been great advances made in the prevention and treatment of post-operative complications, through a more complete study of physiology, anatomy and pathology of the thyroid.

**TIC.**—That infection of nearby foci may cause tic, or a coordinated movement of the type commonly designated as tic, has been repeatedly emphasized during this last few years. Selling (Archiv Neurol and Psychiat 22 1163 (Dec) 1929) reports several cases which showed clinical recovery following the clearing up of a sinus infection. On the other hand, W. Russel Brain (Lancet 1 1295 (June 23) 1928) prefers to limit the term "tic" to acts resting on a functional basis only. He believes that a tic is ordinarily a manifestation of a conditioned reflex, and that an originally valid stimulus becomes associated with fear or some other emotion through secondary conditioning. Thus, a spasmodic movement of the neck in response to an uncomfortable collar or tie, receives attention from the parents who warn the child not to repeat the gesture. This motor act, primarily a response to an irritating skin stimulus, is thus engrafted on to an emotion, fear or reproach, and is thereby perpetuated. Once established, a tic, like other neurotic manifestations, is exploited by the patient as a means of attracting attention or gaining sympathy. For a condition psychologically precipitated, treatment must be psychologically guided. The mechanism should be unearthed and explained to

the patient. Relaxation of the musculature involved, and controlled exercises may be instituted. Surgical intervention is indicated only in *torticollis*, and then only in extreme cases. W. E. Dandy (Arch. Surg. 20 1021 (June) 1930) recommends central intradural section of the eleventh cranial and first 3 cervical nerves, reporting success in managing *torticollis* in this way. The consensus of opinion, however, among neurologists is that **psychotherapy** still remains the best method of treating functionally induced tics.

**TINNITUS AURIUM.—ETIOLOGY.**—Tinnitus aurium is perhaps one of the most frequent complaints for which treatment by an aurist is sought. It is not a disease in itself nor a definite symptom of aural disease, and its cause is still unknown, although it is often found as one of the complaints in any disturbance of the middle, external canal, or internal ear. While pathognomonic of blockage of the Eustachian tube, tinnitus is also found constantly in otosclerosis where the closed tube seldom enters into consideration. Foci of infection in the nose and throat, as well as in remote locations, have also been considered. I. H. Jones and V. O. Knudsen (Laryngoscope 38 597 (Sept) 1928) feel that any cochlear defect, with or without tinnitus, should make one search diligently for a focal source, particularly if no previous toxemia such as mumps, scarlet fever, influenza, or meningitis has been present. Drugs, particularly quinine, also alcohol and tobacco have been held responsible in some cases and these seem to act on the nerve itself. The rôle of hypertension has also been

considered as an important factor and certainly in those cases where the tinnitus is usually bilateral, it is well to investigate the blood-pressure

D W Drury (J A M A 91 1508 (Nov 17) 1928) shows the relationship of endocrine disorders to tinnitus aurium. Of 1000 cases studied by him, 585 were demonstrably endocrine, and he concludes that, while tinnitus aurium is not characteristic, it is nevertheless very often encountered in endocrine hypofunctions. Pituitary hypofunction was associated with the tinnitus in 36 per cent of the cases, thyroid hypofunction in 34 per cent, gonad hypofunction in 36 per cent, suprarenal hypofunction in 25 per cent and pluriglandular hypofunction in 38 per cent.

**DIAGNOSIS**—T J Williams (An Otol Rhin and Laryng 37 992 (Sept ) 1928) feels that he can localize the lesion or the cause on the basis of the type of the tinnitus. He states that hissing sounds usually indicate trouble in the labyrinth at the point of nerve termination. Clicking is attributed to the spasmodic contraction of the salpingopharyngeus muscle. Bubbling noises may arise from an exudate in the middle ear. Pulsating or beating noises are due to circulatory disturbances. The causative factor may possibly be a general sclerosis, ossification, or calcification of the eighth nerve or cortex. In some cases, however, the condition is of psychic or neurasthenic origin.

**TREATMENT**—The treatment of tinnitus must be considered under local and general. *Local* treatment is limited to the conditions of the external and middle ear to remove obstructions, relieve local sources of inflammation, and regulate intratym-

panic pressure. *Constitutional* treatment, of which the physician is often negligent, should not be slighted in the attempt to treat the process solely as a local condition. This method of treatment is directed toward the general condition of the patient, seeking a focal or toxic source in the teeth, tonsils, sinuses and even in the gall-bladder and prostate. Naturally where the eighth nerve has been affected already, treatment is of no value, the same holds true of the syphilitic affections leading to tinnitus. Hyperthyroidism and hypertension, where tinnitus is often present, are best treated symptomatically by a competent internist. The destruction of the cochlea or the severing of the eighth nerve are attended by sufficient danger and the results do not warrant such procedures. The **bromides** have been used efficiently. The English otologists use **dilute hydrobromic acid** in 1 fluidram (4 c c) doses 3 times a day in water.

Tinnitus aurium is such a dread affliction, and the treatment of it so disappointing, that any method which has been attended with however small a degree of success is worthy of record. Consequently, F P Sturm (J Laryng and Otol 42 449 (July) 1927) cites several examples where relief from tinnitus has followed instillation of **atropine** into the middle ear through a previous perforation of the drumhead, or *via* the Eustachian tube, or by soakage of the intact tympanic membrane. The 2 cases where severe tinnitus of long-standing disappeared immediately following the local use of atropine had middle-ear suppuration with large perforations. In the presence of paracutic deafness, shortened bone con-

duction, or any stage or degree of primary or secondary otosclerosis or nerve deafness, atropine has sometimes no effect, sometimes changes the pitch but not the severity of the tinnitus, often relieves, but has never cured

**TISSUE CULTURE.**—Quantitative counts of cells in mitosis in tissues cultures, as made by A Fischer and R C Parker (Brit J Exper Path 10 312 (Oct) 1929), showed that the percentage of cells dividing in malignant tissue greatly exceeds that of normal tissue (fibroblasts) in spite of the fact that the growth rate of the latter may exceed that of the former by several hundred per cent. In cultures of normal tissue the greatest number of dividing cells is to be found in the marginal areas. In cultures of malignant tissue there is no appreciable difference between the number of dividing cells to be found in central and marginal regions. These differences are interpreted as due to a relatively short life of the carcinoma cell and its ability to live and multiply at the expense of substances which arise from a breaking down of sister cells.

These same students of tissue cultures also found that when cells of the fibroblast type isolated from the perichondrium are cultured for several months, they do not lose their capacity to produce material analogous to bone ground-substance. This indicates that cell specificity of function tends to be maintained even when morphological differentiation is lost. The chief factor which inhibits development or expression of cell function is apparently active cell proliferation. When cell division rate

is retarded then its special functional properties tend to appear.

A Fischer and R C Parker (Arch exper Zellforsch 8 325 (July 31) 1929) have developed a technic by which it is possible to keep tissue cultures healthy without growth or at least with very little growth. From this much information as to cellular metabolism may be obtained. Of interest is the finding of Baker that the —SH compound glutathione accelerates growth of sarcomatous fibroblasts in tissue cultures.

**TOBACCO.**—From a clinical study on tobacco smoking, W M Johnson (J A M A 93 665 (Aug 31) 1929) arrived at the following conclusions: (1) Tobacco smoking apparently has no permanent effect on blood-pressure. (2) There is no foundation for the popular belief that smoking decreases the weight of an individual. (3) It is doubtful whether tobacco plays a major part in the etiology of angina pectoris. (4) The act of smoking, if it affects blood-pressure at all, reduces it temporarily. (5) The effect of tobacco smoking is chiefly local, exerted principally on the pharynx.

Analysis of hundreds of cases has convinced I Gray (Ann Int Med 3 267 (Sept) 1929) that tobacco smoking should be considered an etiologic factor in gastric functional disturbances. Individual sensitivity, rather than the amount of tobacco consumed, appears to be the determining factor as regards the symptoms. Approximately one-fourth of the individuals with gastric functional disturbances, attributable to tobacco smoking, show a hyperacidity, and about one-fifth a subacidity. Clinical improvement in some of these patients with ulcer occurs only after cessation of smoking. The therapeutic test, and not the chemical and roentgen observations, is the criterion as to whether or not a person should smoke.

H S Dichtl (Minnesota Med 12 424 (July) 1929) in a study made on a group of smokers and non-smokers, taken from freshmen, university students, drew some interesting conclusions. He found that the

students who smoke are slightly older and for the most part come from larger cities than the non-smokers. The mean height, weight, vital capacity, blood-pressure and pulse rate do not show any significant difference between the 2 groups. However, the mean grade on Schneider's cardiovascular physical fitness test is significantly lower among the smokers than among the non-smokers.

**TONSILS.**—R H Fowler and T W Todd (J A M A 90 1610 (May 19) 1928) find that (1) To place tonsil surgery on a basis of scientific accuracy, the structures involved must be fundamentally sound, (2) the tonsil itself is a lymphoid lined pocket, (3) the upper lobe is a hood and the lower lobe is a pocket, (4) that the capsule is a thin sheet of fibrous tissue left covering the tonsil after removal, (5) the superior constrictor muscle is not an immediate relation, since the palato-pharyngeus muscle lies between it and the "capsule," to which it is attached at the groove, between the upper and lower pockets, by a bundle of fibers, which they call the tonsillo-pharyngeus muscle, (6) if this muscular attachment is teased through, complete enucleation of the tonsil can be carried out easily and without injury to the underlying structures.

W E Cooke (Am J Dis Child 35 229 (Feb) 1928) traces the development of the *adenoid* from its incipency at about the fourth month of fetal life to its completion in infancy. He states that there is no reason to believe that the lymphoid tissue of the adenoid differs from that in other parts of the body, and it is suggested that its only special object is to function as a surface filter for inspired air, and as a first line of defense. The condition which at-

tracts attention and invites surgical intervention is hypertrophy.

**BACTERIOLOGY.**—Much work has been done in the study of bacteriology of the tonsils and various methods have been employed in obtaining cultures, such as swabbing, punching out tonsil tissue and by suction. L M Polvogt and S J Crowe (J A M A 92 962 (Mar 23) 1929) made cultures by swabbing the surface of the tonsils of 100 patients. In 91 cases the hemolytic streptococcus was the predominating organism and in 9 patients the staphylococcus predominated.

**TONSILS AS FOCI OF INFECTION.**—A della Cioppa (Riforma med 45 131 (Jan 26) 1929) examined 220 children between the ages of 4 and 12, in the Antituberculosis Institute in Naples, and has noted the normal and abnormal conditions of their tonsils in relation to the presence of lymphadenitis of the neck, more especially of the suprahyoid region and the angle of the maxilla, and their predisposition to tuberculosis. He found the tonsils normal in 23 per cent and hypertrophied in 77 per cent. Among the normals, 24 per cent gave positive Pirquet reactions, and among the abnormals 51 per cent were Pirquet positive. He states that the high percentage of lymphadenitis and positive Pirquet reactions met with in those children with abnormal tonsils indicates the importance of inflammation of the tonsil in relation to invasion by tuberculosis.

In an analysis made by A D Kaiser (Am. J Dis Child 37 559 (Mar) 1929) of 439 rheumatic children to determine the relationship of tonsils to acute rheumatism during



childhood, the following facts were disclosed. The most susceptible age for the first attack of rheumatism is between 8 and 14 years. In nearly twice as many children in the community studied, the first attack of rheumatism developed when the tonsils were still present. Recurrent attacks of rheumatism occurred 10 per cent less often in children who had their tonsils removed after the first attack of rheumatism than in those whose tonsils were not removed. The incidence of carditis as a complication in acute rheumatism was nearly as frequent in children who had undergone a tonsillectomy as in those who had not. Chorea occurred as a complication in acute rheumatism with equal frequency in children operated and not operated on, but the association of carditis with chorea was less in children whose tonsils had been removed. According to Kaiser, tonsils are the avenue of infection in many cases of rheumatism and bear a definite relationship to this disease. Their removal should be advocated in the rheumatic and potentially rheumatic child until more is known of the etiology of rheumatism.

In the relationship of gastric disorders and chronic tonsillitis, Karl Kofler (*Wien klin Wchnschr* 41: 768 (May 31) 1928) concludes that there is a small group of patients with gastrointestinal symptoms, especially with pyrosis, in whom every form of treatment fails, and that the cause of these symptoms, almost without exception, is to be sought in chronic disease of the tonsils. The author was able to show that the symptoms entirely disappear after tonsillectomy and healing of the focal disease.

In a study made by W. B. Farnum (*Am J M Sc* 176: 465 (Oct) 1928) on the effect of tonsillectomy on existing cardiac disease in adults, 526 patients were followed for from 2 weeks to 9 years. In this group, 180 of the cases had a tonsillectomy performed before coming under observation. Most of the operative procedures were done under general anesthesia (ether). He found that these patients, with few exceptions, stood the shock of operation surprisingly well. The author further found that tonsillectomy, although carried out under as nearly ideal conditions as may be obtained, will initiate an attack of acute rheumatic polyarthrititis in a certain number of cases and further an actual spread of endocardial or myocardial infection. Tonsillectomy does not by any means stop the recurrence of sore throat. Farnum concludes from his study that in adults with existing cardiac disease, the hope for improvement placed in tonsillectomy has been based on an uncertain foundation. If tonsillectomy is to be generally used in the future as a definite therapeutic measure in cardiac disease, its best results will be obtained before the incidence of heart infection or very early in its course.

**TONSILLITIS, ACUTE—COMPLICATIONS**—Among the complications of acute tonsillitis, the perforation of a peritonsillar abscess is the most frequent. S. D. Greenfield (*Arch Otolaryng* 7: 239 (Mar) 1928) relates his experience of about 190 cases of peritonsillar infection. He states that the anatomy of the tonsil and its bed predisposes to the collection of inflammatory products between the tonsil and the neighboring

structures. In the majority of cases the pus collects in the supratonsillar fossa, resulting in a bulging and swelling of the soft palate and edema of the uvula. The pus may collect between the tonsil and the posterior pillar. Pus may pierce the superior constrictor and collect in the pharyngo-maxillary space. Recurring peritonsillar abscess may be multiple or multiloculated on account of the formation of fibrous partitions. The treatment of peritonsillar abscess is **incision and drainage** when the diagnosis is evident.

**TUBERCULOSIS**—Primary tuberculosis of the tonsil is very rare. In a review of the literature, A. Drosler (*Monatschr f Kinderh* 43: 240 (May) 1929) found only 1 case of unquestionable primary tuberculosis of the tonsil. He reports an instance of this condition observed personally, in which the death of the patient from bronchopneumonia made it possible to demonstrate conclusively, by careful post-mortem examination, that the tuberculosis of the tonsil was primary.

**TONSILLECTOMY, INCOMPLETE—RESULTS OF**—P. S. Rhoads and G. F. Dick (*J. A. M. A.* 91: 1149 (Oct. 20) 1928) state that in their experience, the poor results obtained in patients who had undergone tonsillectomy were often due to the fact that in a large number of instances the tonsils were incompletely removed. They found in routine physical examination of young women that in 73 per cent of those who had been subjected to operations for the removal of tonsils, fragments of tonsillar tissue of appreciable size remained in the throat. They showed by quantitative bacteriologic methods

that such fragments contained more pathogenic bacteria per gram than tonsils removed for the first time. The average count per gram in the "tonsil stumps" was 7,341,000, as compared with 5,693,000 in tonsils removed for the first time. The authors cited cases in which systemic disease, because of which tonsillectomy was undertaken, did not clear up until "tonsil stumps" remaining from the first operation were removed. Their results indicate that incomplete removal of tonsils in many instances leaves a patient in worse condition than he was before the operation.

**TRACHOMA.** See CONJUNCTIVITIS, GRANULAR.

**TRAUMATIC INJURIES.—ETIOLOGY—SKIING ACCIDENTS**—W. Knoll (*Lancet* 1: 332 (Feb. 16) 1929), in an analysis of 430 injuries, indicated that 10.4 per cent of the injuries concern the head and trunk, 14.8 per cent the upper limbs, and 74.8 per cent the lower extremities. There is a definite correlation with changing snow conditions, when there is a deep powdery snow, sprains and tears of ligaments in the knee and ankle joints predominate, while on a hard surface, fractures of one or both legs occur. The torsion fracture of the fibula at its lower end is the commonest leg injury. Supination fractures of the outer ankle occur as the result of the Christiania swing. Torsions occur in stemming and Telemark turning. The interesting fact is that the injury precedes the fall. It is torsion of the body on a leg, which is more or less fixed by the ski-binding or by the snow, that is the immediate cause of the injury.

In women, knee distortions are more frequent than in men, with a tear (seldom a complete separation) of the collateral tibial ligament with subsequent marked abduction of the leg (48 per cent in women and 19.7 per cent in men). In men, ankle injuries are more frequent, 54.2 per cent to 34.5 per cent in women. The different relation of the axes of the thigh and leg, which allows in the woman much severer loading of the knee in the direction of genu valgum, may be regarded as the reason for this difference.

**INDELIBLE PENCIL WOUNDS**—A woman, reported by Veen, while holding an indelible pencil in the hand fell in such a manner that the pencil entered the right nostril and penetrated the flesh and went deep into the cheek. The point had broken off when it struck the bone. The right cheek began to swell. A month later, on puncture, a dark violet mucoid fluid escaped. It contained a few leukocytes and was sterile. On opening the cavity, the point of the pencil was found and the wall scraped with a sharp curet and a drain was inserted. The drain was removed in 24 hours and the wound healed rapidly, most likely because of the antiseptic action of the aniline dye.

**POST-OPERATIVE WOUND INFECTION**—Inadequate skin preparation as a cause of post-operative wound infection is considered by H. B. Sutton (New York State J. Med. 28: 129 (Feb. 1) 1928). When the skin was prepared with iodine, from 25 to 100 per cent of excised specimens of the skin yielded a growth of bacteria on culture. Coley says that the incidence of post-operative wound infection following preparation of the

skin with iodine is 12.8 per cent. Tinker and Sutton found that with Harrington's solution, a positive culture was obtained in 12 per cent and infection of the operative wound occurred in 1 per cent. When acriflavine was used no infections or positive cultures occurred.

F. L. Meleney, F. B. Humphreys and L. Carp (Surg. Gynec. Obst. 45: 775 (Dec.) 1927) isolated a new species of pathogenic anaerobic bacillus of the gas-gangrene group from a fatal operative wound and called it "*Clostridium edematoides*." The source of the infection was traced to surgical catgut which was not sufficiently sterilized. The chromic catgut used yielded *Clostridium novyi* and 2 strains of the newly discovered species, 2 strains of hemolytic *Clostridium welchii*, and 2 other non-pathogenic spore-forming organisms.

The *Clostridium edematoides* produces a true exotoxin not neutralizable by the antitoxins of the other gas-gangrene producing organisms, and its specific antitoxin is ineffective against the toxins of the others.

Clinically the condition was characterized by a brawny, red edema of the abdominal wall around the wound, severe pain at the site of the lesion, fever, leukocytosis, a rapid and feeble pulse, nausea, profuse perspiration and toward the end, somnolence, irritability, profound prostration and circulatory failure. The organism was obtained at autopsy from the deep tissue.

**TREATMENT**—Physical measures in industrial injuries are considered by Portmann. The paraffin bath consists of a metal container which is heated electrically and is insulated like a fireless cooker. In this con-

tainer commercial paraffin is melted and is kept at a temperature of from 125° to 135° F (51.5° to 57° C). The part to be treated is submerged in the liquid paraffin for from 20 to 30 minutes. A crust of paraffin coats the part and acts as an insulation, a lasting hyperemia is obtained which is analgesic and a good preparation for the massage or corrective manipulation that follows in the treatment of chronic joint disturbances and of fractures or sprains of the foot, ankle, hand, wrist, forearm, or elbow, where diathermy can not be used.

A treatment of *infected wound* without sutures, drainage tubes or antiseptic dressings, is described by H. W. Orr (J. Bone and Joint Surg. 10:605 (July) 1928). In the treatment of *compound fractures* the fundamental requisites are adequate drainage during any period of infection, maintenance of the parts in a position which is favorable for circulation and repair, protection of the fracture against muscle spasm and other forms of irritative motion, protection of the area against the invasion of additional infection, and sound healing in a position which will be entirely suitable for the early resumption of function. The infected compound fractures are placed in the correct position with the use of a fracture table, skeletal traction is used if necessary and the primary treatment is as simple as possible. The wound is packed wide open in every part with an aseptic, non-absorbent mass, and over a dry sterile dressing a splint or cast is applied which will maintain the parts in the correct position. No stitches, tubes, irrigations, or wet packs are employed. The vaseline mass is inserted to facilitate drainage and for

secondary protection. No dressings are done. The primary dressing is allowed to remain in place for from 2 to 6 weeks.

In the actively infected case the treatment should consist in cleansing of the infected area, wide open drainage by a sterile pack, splinting in the correct position and measures to prevent further irritative motion, and to insure against dressing infection.

**SURGICAL INFECTIONS.**—Among 15,460 surgical patients in F. Rost's hospital (Med. Welt 2:1603 (Oct. 27) 2:1636 (Nov. 3) 1928), 132 died of acute wound infection. The infection started in a small wound more often than in a large wound, and as often in a wound of an upper, as in one of a lower, extremity. The patients were vigorous and in the best years of life. In small wounds the bleeding should be permitted to continue until it stops, then the wound is washed with soap, water and alcohol. If the wound is on a finger, a splint is applied to immobilize it. A mild degree of passive congestion has proved valuable. For extensive injuries, the main reliance is placed on **wound excision**, with partial or complete suture, provided the patient is seen within the first 6 hours. **Balsam of Peru** is poured into every large and dirty wound. Deep antiseptics by injection of antiseptics into the musculature and other surrounding tissues is advocated by the author. **Tetanus antitoxin** and **gas gangrene serum** should be injected in cases of large wounds. For irradiation of wounds the ordinary electric lamp placed near the wound for half an hour daily is recommended.

**WOUND HEALING.**—Primary wound healing (A. E. Hertzler, Am

J Surg 7.293 (Sept) 1929) occurs by the coagulation of exudate, forming a fibrillar fibrin which is converted into adult tissue by a chemical process. Healing of muscle to fascia is dependent on the production of a myositis, which results in the production of fibrous tissue.

*Relation between healing of wounds and acid-base equilibrium* — A large X-ray ulcer on a patient's back, seen by H Kalk (Klin Wchnschr 8 1074 (June 4) 1929), resisted treatment for 15 years. The patient developed a stenosis of the esophagus, due to a carcinoma, and the intake of food became limited. During the period of starvation, the ulcer on the patient's back healed in a short time. The fasting caused an acidosis, producing a change in the acid base equilibrium. Sauerbruch made a similar observation and pediatricians report that infants with pyloric stenosis are usually free from infections.

S Hediger (Klin Wchnschr 8 1452 (July 30) 1929) treated wounds by applying carbon dioxide. The gas passes through a washing bottle into a rubber cap that covers the wound. Two treatments daily are given, each one lasting from 1 to 2 hours, about 50 liters (quarts) of carbon dioxide being required hourly. The gas produces a hyperemia of the wound area and a more profuse secretion. In a few days the wound becomes clean, granulations appear and epithelialization starts from the edge. This treatment is especially suitable for slow healing wounds.

Epithelial healing takes place through the ameboid movement of cells from the surrounding epithelium, according to S W Hartwell (Arch Surg 19 835 (Nov) 1929). The process of

epithelialization is completed by the union of 2 such membranes from opposite sides of the wound, followed by the rearrangement and multiplication of the cells of the membrane. Mitosis occurs secondarily to cellular movement and late in the process of healing. Most of the cells which form the extension membrane are derived from the prickle cell layer of the old epithelium. A basal cell layer is formed under the epithelial outgrowth by a rounding up and alignment of the lowermost cells of the membrane, rather than by outgrowth of cells from the old basal layer. The prickle cell of the normal epithelium is, therefore, capable of becoming the basal cell in the epithelium of the scar and must be considered the primary cell in the regeneration of epithelium in the healing of wounds. The base available for the support and advance of the epithelial membrane and the rate of cornification of cells of the membrane are the chief factors determining the time and place of the union of the epithelium from the 2 sides of the wound.

Considering the influence of innervation of the reticulo-endothelial system in the process of wound repair, P Cazzamali (Clin Chir 32 497 (May) 1929) found that lesions of neither the spinal nervous system (resection of the nerves of the limb) nor the sympathetic nervous system modify the appearance, disposition, number or frequency by the cells of the reticulo-endothelial system delegated for the repair of a wound. The system behaves, during the course of the reparative process, just as it does in wounds not subjected to any alteration of the spinal or sympathetic nerve fibers.

Using silver foil in treatment of wounds P Moritsch (Zentralbl f Chir 56 1410 (June 8) 1929) found that healing results more promptly, the wound remains clean and free from secretions, while the dressings are easily changed and without causing pain. After phimosis operations the foil prevents edema. Stitches need not be removed early and there is no danger of sepsis. The foil is cleansed or rinsed with alcohol and laid upon the wound.

**Embryonal material**, consisting of specially prepared macerated rabbit embryos removed from the uterus immediately after the mother rabbit had been bled to death, was used to promote wound healing by W Schloss (Arch f klin Chir 151 701 (Oct 19) 1928). Forty patients presenting various conditions such as *abscesses*, *post-operative fistulas*, *phlegmons*, *carbuncles* and *osteomyelitic granulations*, were treated with this tissue. In 57.5 per cent of the cases very good results, in 15 per cent good results, and in 12.5 per cent fair results were obtained. In 15 per cent no effect was noted.

S Frey (Deutsche Ztschr f Chir 212 325 (Dec ) 1928) feels that pre-operative X-ray irradiation has a distinct influence on post-operative wound healing. The circulation in irradiated tissue is impaired, the lumen of the vessels is narrowed and some of the smaller vessels are completely obliterated. Two applications of a unit skin dose at intervals of 3 months had no effect on the vessels. Three doses, at intervals of 8 weeks, had a distinctly noticeable effect on the arteries. Four doses, at intervals of 6 weeks, caused a narrowing of the vessels and the obliteration of some

of them. Six treatments caused a considerable narrowing of the vessels and marked reduction in their number. If the operation is performed not later than 8 weeks after the treatment, wound healing is not interfered with, as up to that time the vessels remain unaffected, but if the operation is performed 3 months afterward, some delay or slowing up of wound healing is noted, and this increases proportionately with the length of the time interval.

W L T Addison (Canad M A J 18 700 (June) 1928) found that (1) **calcium chloride** exaggerates (Nagi and Ito) the phagocytosis of bacteria, accelerates the phagocytosis of dead tissue, and accelerates this regeneration of granulation tissue. (2) The potash salts greatly accelerate the regeneration of granulation tissue and maintain the vitality of the endothelial and fibrous tissue. (3) In one of the cases an increase of sodium salts inhibited the regeneration of tissues, but in the other it caused the breaking down of the granulations already formed and of well-established scar tissue to form a new ulcer. (4) The sodium ion tends to bring about a degeneration of the vessel structures, and the calcium and potassium bring about a regeneration of these tissues.

A **halogen solution** prepared by Ulzer, of Vienna, has a favorable effect on the healing of wounds in the hands of Albrecht (Zentralbl f Chir 55 115, 1928). It does not injure muscle, connective tissue, or fatty tissue, but has an irritating effect on mucosa. Its bactericidal power on common types of bacteria was proved in a series of experiments *in vitro* by Risak and Homma.

It can be used in *phlegmons* follow-

ing incisions, *abscess, hematoma, traumatic suppurating wounds* and in *anaerobic infections*, as it is able to destroy the very resistant spores. In *suppurative appendicitis*, abdominal wounds treated with the solution healed by secondary intention in 13 per cent of the cases, whereas of those not so treated, suppuration occurred in 38 per cent. The scars of wounds treated with the halogen solution seem to be particularly firm.

Carrel, in 1910, found that there is a quiescent period of from 1 to 5 days between the infliction of a surface wound and the beginning of the diminution in its area, that the diminution is caused by the contraction of the granular bed, which is soon overlapped by the decrease in size, as a result of the ingrowth of epithelium from the wound edges. According to E. L. Howes, J. W. Sooy and S. C. Harvey (J. A. M. A. 92:42 (Jan. 5) 1929): (1) It has been found possible to determine the rate healing of the simple incised wound in the skin, fascia, muscle and stomach. (2) The tensile strength of a healing wound is a function of the fibroplastic process. (3) A curve expressing this shows a lag period of from 4 to 6 days and then a phase of fibroplasia, rising rapidly at first, and then more slowly as it approaches the maximal strength of the wound. (4) The latter point is attained in from 10 to 14 days.

It is in the quiescent stage that the strength of the wound must be artificially reinforced by the use of sutures. During the phase of fibroplasia the strength of the wound is developed up to a maximal point.

E. L. Howes and S. C. Harvey (New England J. Med. 200:1285 (June 20) 1929) believe the holding

power of a stitch is in direct proportion to the degree of condensation of connective tissue in the structure in which the stitch is placed. The holding power of a stitch decreases during the first 2 or 3 days and more rapidly than the tensile strength of chromicized catgut during the same period. The quantity of gut employed should be the least that is necessary to sustain the approximation of the tissues, because the greater the amount of suture material embedded within a given area, the greater the degree of reaction of the tissue. It was found that No. 0 twenty day chromic catgut meets all requirements of the stitch in facial and connective tissue layers.

**TRAUMATIC NEUROSIS.**—M. Osnato (Am. J. Psychiat. 9:643 (Jan.) 1930) believes that the term traumatic neurosis should be limited to those cases exhibiting primitive instinctive emotional reactions to injury. These reactions may be considered as being the response of even a normal personality to fear and pain and the other acute distressful features associated with the accident. Thus, the ego is overwhelmed and emotional symptoms occur. These symptoms may last until the stimulus arousing the responses is removed by change of type of occupation, etc. He distinguishes this group from the traumatic hysterics in which the reactions primarily are not directly determined by any pathological considerations due to the injury, but are chiefly conversion phenomena occurring in maladjusted individuals who are apt to be physically, emotionally, and even intellectually inferior types. In these the mechanism, namely, the conver-

sion of the emotional response to difficulties into symptoms, is the same as in the hysterias of civil life not occurring in connection with trauma

It is to this last group that J Fetterman (J A M A 91 315 (Aug 4) 1928) refers. He states that a traumatic neurosis develops in a susceptible individual from fear, is fed by fear, and as it grows, develops as its aim the procuring of sympathy and financial return for the patient. The cause of the neurosis is not so much the trauma, as the susceptible individual. There are 4 types of susceptible individuals

1. Those who inherit poor nervous stock

- 2 Those who are the subjects of poor early training (with the poorly trained child, sickness and crying become the means of attracting attention)

- 3 Those who suffer from chronic ill health as the result of repeated illnesses or prolonged infections

- 4 Those who are the subjects of poor inheritance and faulty training—this forms the largest group

As the individuals who suffer the severest trauma do not usually develop a traumatic neurosis, the condition is not set up so much by the trauma as by fear. Continued fear—of disfigurement, of financial loss, of ill health or accentuated by over-sympathetic alarmist neighbors—keeps the condition alive. (In this connection W F Schaller and M R Sowers (J A M A 93 967 (Sept 28) 1929) call attention to the fact that the physician is often the very one to establish a doubt or cause a fear state by a too sympathetic attitude or by too long continued treatment of a special nature.)

Also the neurosis accomplishes another purpose for the patient. It procures sympathy for him and because someone else is usually responsible for the accident, the patient feels revengeful and this feeling can only be satisfied by compensation. (The desire for financial gain, however, is not synonymous with traumatic neurosis.)

Osnato (*loc cit*) believes that *post-concussion neurosis* is a traumatic encephalopathy resulting from a diffuse hemorrhagic process followed by secondary diffuse glial and ganglion degenerations. Although the symptoms of the post-concussion state eventually become almost wholly subjective, they have an organic basis. In diagnosing the condition it is necessary to inquire carefully into the symptoms at the time of injury. In the true concussion cases the patient at that time showed true loss of consciousness, alteration of the deep reflexes and pupils, marked general vasomotor disturbance with pallor, cold extremities and sweating, low blood-pressure at first, sometimes followed by a rather rapid rise if associated with intracranial bleeding, often a very slow pulse in the beginning, later a rapid, small thready pulse, and in very severe cases, occasional disturbance of sphincter control. For several days following the concussion and often for much longer periods, the patient shows marked mental and physical retardation, often accompanied by confusion, irritability, drowsiness at first and some days later by great restlessness and anxiety at night.

J Kasanin (J Nerv and Ment Dis 69 385 (Apr) 1929) believes that, in children, a similar basis underlies certain cases of psychopathic per-



sonality, which he defines as those whose behavior shows no improvement under repeated changes of environment and intensive psychotherapy. Ten per cent of these children in his series had a history of cerebral trauma in contrast to 2 per cent of the control group. Their behavior resembles that of post-encephalitic cases, with emotional instability, temper tantrums, egocentricity, and inability to follow a goal. As organic treatment is impossible, he believes that they should have prolonged and intensive training in a standardized and rigid environment.

**TREATMENT**—Regarding treatment, Fetterman (*loc cit*) states that first and most important is an attempt to remove the susceptibility of the patient before accident by training individuals not to react to a reverse in a disheartened manner. The treatment at the time of accident must be both physical and mental. Not alone should the injured part be cared for, but in those who are susceptible the mind should be protected against a possible nervous reaction. Fright should be lessened, fears should be calmed, all the worries anticipated. We should try to thwart in advance the possible unfavorable suggestions of friends. Financially, too, something should be done, if possible, to prevent the neurosis. (Schaller and Sowers (*loc cit*) draw attention to the unusual course of the efficiency or work curve in the traumatic neurosis. Contrary to the expectation of a gradual increase in efficiency, there is either an arrest, a decided falling off, or a total inefficiency. They designate this point of negative departure, when fitness is expected to parallel tissue repair and restored

organic function, the *precipitation point* of the neuroses. In their series, this point occurred about 107 days from the time of injury. They suggest that the precipitation point be taken as the basis of an approach to a financial settlement or closure of the compensation case on the grounds that the removal of the unfavorable suggestion of compensable disability and return to occupation operate as beneficial measures for the patient.)

For the advanced case, **psychotherapy** is indicated by allowing the patient to explain all his symptoms and their origin. He should be encouraged to relate, if possible, what previous failures there have been in his life that the neurosis is concealing. Clear and wholesome ideas should then be transfused into his mind. The correct meaning of his somatic symptoms should also be explained to him and the path of his duty pointed out. The patient must be first won over by a show of sincerity and by a thorough physical examination, and then whatever is said carries conviction and is apt to be believed.

**TUBERCULOSIS, PULMONARY.**—It is gratifying to note that the trend of the tuberculosis death rate and the morbidity or case rate are continued downward. According to H. E. Kleinschmidt (Am Rev Tuberc 21: 813 (June) 1930), this may be due to a downward slope of a cycle and later, the death rates may again take an upward turn. But this diminishing death rate is probably due to a more complete understanding of the biology of tuberculosis, with practical applications of knowledge both to the individual and, from a larger point of view, in a preventive way to protect the population at large. Or, hypothetically, the race, due to continued exposure, may be becoming immune, in a measure, to the serious effects of the disease. He points out that

the only specific immunity against tuberculosis is acquired as a result of mild infection. The chance of becoming infected depends on the possibilities of exposure to doses of bacilli and the size of these doses. This is, in turn, dependent upon the number of infected individuals in the environment of any given person. From a practical point of view, the profession seeks not only to avoid infection, but to build up the resistance of patients already infected. Kleinschmidt regards it as utter folly to think that tuberculosis may be completely eradicated within a term of years. The author is of the opinion that so long as the public interest can be aroused and maintained in the war against tuberculosis, the death rate will continue to fall and artificial immunity may be developed so that a diminishing number of actual cases will appear.

W. W. Lee (Am Rev Tuberc 20 368 (Sept) 1929) believes that, if the present trend of tuberculosis mortality continues, by 1970 the general death rate due to tuberculosis should be about 10 per 100,000 population or approximately equal to that of diphtheria at the present time.

#### ETIOLOGY AND PATHOGENESIS

Numerous investigators, including S. R. Gloyn, R. E. Glover and A. S. Griffiths (J Path and Bact 32 775 (Oct) 1929) have repeatedly failed to demonstrate the existence of a filtrable form of the tubercle bacillus. O. Thomsen (Ugeskr f Laeger 91 729 (Aug 29) 1929) maintains that it is premature to reject the possibility of a filtrable tuberculosis virus, since a large group of investigators are of the opinion that such a form exists. F. Arloing (Riv di pat e clin d tuberc 1 481 (Nov 30) 1929) states that transplacental transmission of the filtrable virus of tuberculosis appears to justify the following conclusions: (1) The filtrable virus is quickly fatal, causing a caseous form of tuberculosis of moderate degree which becomes generalized and is somewhat different in its aspects from the ordinary nodular form, (2) it may produce the syndrome of abiotrophy of the newborn, causing death from emaciation, (3) it may remain quiet for many years and finally become active in childhood, adolescence or maturity, and produce the ordinary form of tuberculosis,

or (4) without developing, it may produce in the organism that received it through heredity, an allergic state that finds outlet either in hypersusceptibility to exogenous superinfection or in resistance to the infection.

F. Keller and R. Wethmar (Ztschr f Tuberk 54 22 (June) 1929) were able to demonstrate the passage of a few tubercle bacilli through number L<sub>2</sub> and L<sub>3</sub> Chamberland filters. The bacilli were demonstrated by animal inoculation but could not be demonstrated by cultivation. Due to the filtrability of the tubercle bacillus itself, these investigators question the existence of a filtrable tuberculous virus differing from the bacillus.

In France, Calmette continues to advocate vaccination of children against tuberculosis by feeding them attenuated living preparations of the tubercle bacillus, using a particularly attenuated strain known as (B C G) or *Bacillus Calmette-Guerin*. Discussing the bacteriologic phases of this series, S. A. Petroff (New England J Med 200 1148 (May 30) 1929) points out that the development of this seemingly harmless strain of tubercle bacilli depends upon the principle of microbic dissociation, i.e., the process of variation in the offspring from the mother colony. The variation of the latter colonies may be demonstrated by cultural characteristics. Two or, perhaps, 3 variants may differ from each other not only in colony structure, but also in tinctorial properties, virulence and other biologic characteristics. From 1 single mother colony, Petroff was able to obtain 2 distinct dissociated strains, 1 avirulent and another virulent for guinea-pigs. He maintains that mutation from one strain to the other, from the avirulent to the virulent, may occur. Due to this variability, it appears that there is a possibility of danger in oil vaccination of children against tuberculosis by using the B C G method.

Due to the waxy covering, parafat and lipid content of the tubercle bacillus, it has been generally accepted that this bacillus is one of the most resistant to external agencies, resisting high temperature, drying and water, but not sunlight. V. M. Palmieri (Riforma med 44 205 (Feb 27) 1928) records the case of a man of 21 years exhumed after 4 months burial, death hav-

ing been due to tuberculosis. In spite of advanced post-mortem changes, a naked-eye appearance of tuberculosis was observed in the lungs, and numerous tubercle bacilli were found by using Ziehl-Neelsen stain. From his observation Palmieri states that the tubercle bacillus is markedly resistant to putrefactive processes in the human body.

Studying 169 autopsies, in which the subjects died from causes other than tuberculosis, E. L. Opie and J. D. Aronson (Arch Path and Lab Med 41 (July) 1927) report 304 lesions with characteristics indicating a tuberculous origin. From these lesions material was examined for living tubercle bacilli. In tuberculous lesions found in the bodies of children, or those situated in any part of the lung and associated with corresponding lesions in nearby lymph nodes, living tubercle bacilli were present in 33.3 per cent of caseous lesions, partly fibrotic, and 4.4 per cent of caseous encapsulated nodules. In adult lesions, or those arising in the apex unaccompanied by tuberculosis of the lymph nodes, the percentage of living tubercle bacilli varied from 76.2 per cent in fibro-caseous tuberculosis of the apex, to 2.4 per cent in scars of the apex. From their studies, Opie and Aronson conclude that the greater percentage of living tubercle bacilli obtained from calcified lesions are from adjacent lung tissue. The apical lesions found in adults appear when lesions of tuberculous infection in children no longer have living tubercle bacilli, in other words, they are the result of exogenous infection.

D. J. G. Johnston (Brit M J 2 335 (Aug 24) 1929), studying the question of hilus tuberculosis as an etiologic factor in pulmonary tuberculosis in adults, carrying on his observations over 10 years, and making repeated examinations at intervals of from 3 to 6 months of individuals showing any evidence of involvement, found that the incidence of tuberculosis varied from 4.6 per cent, in 1923, to 15.4 per cent, in 1913. He found a definite connection between septic conditions of the nasopharynx and the prevalence of tuberculosis. However, in clinical evidence suggesting pulmonary tuberculosis in children, the author found actual invasion of the

lung tissue relatively rare. The natural tendency in each case is toward cure, although the physical signs may persist into adult life. Pressure from mediastinal or hilus glands can be demonstrated clinically, and this causes either restriction of the free flow of air through the tubes into the lungs or interferes with the circulation of the blood, giving rise to localized areas of edema, but rarely to general pulmonary edema. Rupture of these glands into a bronchial tube frequently causes tuberculosis of the lungs.

A. E. Augustine (J Prev Med 3 121 (Mar) 1929) has made some important observations in reference to the transfer of tuberculosis by dust and other agents. He found that dust from the rooms of patients who are especially cleanly contained much less infective material than dust from an unsanitary surrounding. Of those patients suffering from open tuberculosis, the material obtained from the rooms of the women more frequently contained active bacilli than from the men. He points out that tubercle bacilli are recovered more frequently from the homes and clothing of colored individuals than from white patients. The number of bacilli found in the patient's sputum, Augustine points out, is a factor in determining the presence or absence of tubercle bacilli in surrounding dust.

**BLOOD**—F. Mattausch (Wien klin Wchnschr 41 624 (May 3) 1928) discusses the 3 blood picture phases, as outlined by Schilling, in relation to the estimation of a given body's resistance to tuberculosis. These phases (1) neutrophil reaction, (2) monocytic reaction, (3) lymphocytic reaction, always occur in the order named, although one may overlap the other. The *neutrophil* reaction, corresponding to the progressive and destructive part of the disease, the *monocytic* reaction, signalling the onset of body defense which lasts for a considerable time, finally, yielding to the *lymphocytic* reaction, when the healing tendency is established, are taken as the usual development in regard to the Schilling index.

W. J. Durel (New Orleans M and S J 81 480 (Jan) 1929) is convinced that the more toxic the patient, the higher the number of monocytes in the blood the lower

the monocyte index. He also found that in toxic cases there is a rise in the lymphocyte index but a fall in the monocyte index. After a reaction to the subcutaneous injection of old tuberculin in reactive cases, a marked rise in the lymphocyte index with a fall in the monocyte index occurred. The neutrophil nucleus index also goes up to around 96. The total count may be slightly increased according to the severity of the reaction.

J. W. Flinn (Ann Int Med 2 622 (Jan) 1929) also draws attention to the importance of the difference of blood count in studying active pulmonary tuberculosis. He believes that the monocyte-lymphocyte and lymphocyte-neutrophil ratios give the truest conception of the status of activity. A decreasing monocyte-lymphocyte ratio and an increasing lymphocyte-neutrophil ratio indicates a more active and extensive lesion. Conversely, the opposite indicates an improved pulmonary condition. An increase in the percentage of neutrophils and of monocytes, with a decrease in the percentage of lymphocytes, point quite definitely to a more active and extensive lesion. The opposite, of course, indicates an improved condition.

Becker (Ztschr f Tuberk 51 222 (July) 1928) discusses the various phases of the leukocytes in pulmonary tuberculosis. He states that the first phase met clinically is that of the neutrophil fighting phase in which neutrophilia with regenerative nuclear shifting occurred, varying with the severity of the struggle. Usually an eosinophilia, lymphopenia and decrease in monocytes also occurred. When the neutrophils decrease and the lymphocytes, monocytes and eosinophils again are found, it is at this time that the organism is entering on the period of best defence, which Schilling designates as the "monocytic phase of recovery." This phase is characterized by monocytosis and a comparatively satisfactory leukocyte count with the lymphocytic phase of healing. The lymphocytes increase, the monocytes may increase somewhat, and there is an increase in the number of eosinophils, with a decrease in neutrophils. Shifting to the left with neutrophilia indicates favorable progress, while absence points to stationary progress. Becker is of the opinion that it is impossible to differentiate between com-

pletely healed and benign stationary tuberculosis from the hemogram alone, and he studied a large number of cases where wrong diagnosis had been made. In tumors of the lung he found a particularly well outlined lymphocytosis. With dermoid cysts there was an eosinophilia. In most cases of malignant disease monocytosis occurred. He found no cases of neutrophilia without nuclear shifting in the cases of malignant tumor. The hemograms of patients having syphilis and tuberculosis at the same time, showed in many cases a marked shift to the left with good lymphocytic response. The sedimentation rate of lymphocytes was greatly increased in all of the cases in which syphilis and tuberculosis were found at the same time.

Studying the *cholesterol content* of the blood in patients suffering from pulmonary tuberculosis, I. Gavrilu and V. Vior (Arch d mal de l'app digestif 18 633 (June) 1928) found the following. In both the local and diffuse fibrous forms of pulmonary tuberculosis, a hypercholesteremia occurs which is more marked when the lesions are inactive, (2) in the localized ulcero-caseous forms, hypercholesteremia occurs which is particularly marked in cases where the lesions are inactive and not undergoing evolution, (3) in the diffuse ulcero-caseous form, hypercholesteremia is found when the lesions are active, with less tendency toward increase in blood cholesterol if the lesions are stationary, (4) exudative pleurisies appear to have no influence on the cholesterol content of the blood, (5) the factors that influence the modification of the cholesterol blood content in order of importance are (a) activity or inactivity of the lesions, (b) degree of immunity of the organism, (c) the anatomicopathologic form, (6) hypercholesteremia indicates a state of well developed immunity and inactive pulmonary lesions and is, therefore, of good prognostic import, whereas, hypocholesteremia denotes a diminished immunity with acute lesions.

**BASAL METABOLISM**—R. Williamson (Quart J Med 23 85 (Oct) 1929) gives his report of the study of 38 cases of pulmonary tuberculosis in which he surveyed the basal metabolic rate. In 19 of these patients there was an increase of more than 10 per cent, the average being

20 per cent, while in the other 50 per cent there was an approximately normal reading. This writer states that with certain reservations, as inanition or cachexia in the advanced stages, the more severe the disease, the higher the metabolic rate. Where a benign tuberculosis exists with fibrosis occurring, the rate will be within normal limits. Ordinarily, the pulmonary ventilation is increased in pulmonary tuberculosis. This is directly proportional to the basal metabolic rate, and either one may be used in following the progress of any given patient. Diminution in pulmonary ventilation appears to be an important factor in treatment of these cases. The carbon dioxide percentage in the expired air is less than normal in individuals suffering from chronic pulmonary tuberculosis. The more extensive the pulmonary lesion, the greater the deviation from the normal reading. The respiratory quotient is frequently slightly below normal in cases of long standing. Repeated examinations of the respiratory exchange in patients with pulmonary tuberculosis gives an index as to the progress of the lesion.

L. W. Frank and L. R. Safarik (Colorado Med. 25: 61 (Feb.) 1928) studied a series of approximately 150 individuals, 20 of them being normal and 128 suffering from pulmonary tuberculosis. These observers believe that the practical value of the basal metabolic rate determinations is not to diagnose a pulmonary tuberculous lesion, but rather more from the point of view of differentiating other lesions, as for example, thyroid lesions, inanition, and so-called neurocirculatory asthenia. An increased pulse rate, when produced by tuberculosis or the neuroses, may be slowed down by absolute quiet, but, if caused by thyroid disease, will remain rapid even following rest. In their conclusions, these authors state that the basal metabolism and pulmonary tuberculosis usually falls within generally accepted normal limits, and they advise this procedure only from the standpoint of differential diagnosis.

**DIAGNOSIS**—The *tuberculin test* and *x-ray* examinations are the 2 methods of choice in the diagnosis of tuberculosis before significant symptoms or signs appear, according to E. L. Opie (Am. J. Roentgenol. 19: 284 (Mar.) 1928). A positive

tuberculin reaction in a child under 1 year of age should be the cause of intensive further inspection, since this is the most ominous period in which tuberculosis may attack an individual. Opie believes that a positive tuberculin reaction in several members of one family, especially if present in those under 10 years of age, points to exposure to an open tuberculosis within the family group, whereas, negative reactions in all of the children indicate that no exposure has occurred. From x-ray examination, advanced tuberculosis of the tracheobronchial lymph nodes may be diagnosed in children who give no physical signs. Spots of abnormal density noted on x-ray plates of the chest of children are frequently due to tuberculous infiltration. Opie believes that approximately one-half of the husbands or wives of those individuals suffering from open tuberculosis have recognizable apical lesions present. Many adolescent children exposed to open tuberculosis contract apical lesions and after several years symptoms and signs appear. All members of a family group in which open tuberculosis exists should be examined.

C. L. Minor (Am. J. Roentgenol. 19: 287 (Mar.) 1928), on the other hand, maintains that *auscultation* is the most accurate means of diagnosing pulmonary tuberculosis, but qualifies his statement by insisting that the examining physician must be able to interpret his findings correctly. The author describes a form of breathing which he designates as granular breathing, where the normal respiratory sound, instead of being smooth and continuous as normally found, rises and falls in intensity and sounds as though it were about to break into moist rales. Minor maintains that an area of this type of breathing limited to a small space which persists is a valuable early diagnostic sign. Râles will later appear in this area if the disease continues. Feeble breathing may be suggestive but is not diagnostic, but prolonged harsh expiration is strongly suggestive. Typical râles of early tuberculous infiltration are dry, sharp, few in number, and heard at the end of cough following expiration. Minor believes that these are the most strongly diagnostic signs that can be obtained in the early cases. He thinks

that physicians ought to be able to recognize tuberculosis in the majority of cases without the aid of the x-ray

F G Chandler (Practitioner 118 341 (June) 1927) believes that failure to diagnose pulmonary tuberculosis in the early stages is due to certain well recognized errors, among which are (1) Ignoring of hemoptysis and a perverse desire to find some totally insufficient explanation for it, (2) the failure to recognize the real significance of an idiopathic pleurisy, (3) a blind faith in physical signs, (4) failure to recognize at first the manifestations of the disease, which will be of a toxemic nature almost entirely, (5) the neglect of routine bacteriological examination of the sputum, and (6) a rather secure, satisfied attitude upon one's own opinion. Chandler offers as the 4 cardinal symptoms of early pulmonary tuberculosis (1) Progressive loss of weight, (2) progressive weakness, (3) hemoptysis, (4) evening fever. [It appeared to the Editors that these 4 cardinal symptoms represent the findings in well developed forms of tuberculosis when the disease has established a firm foothold within the body economy, at which time treatment will be of correspondingly less efficient nature than if the lesions could be recognized considerably earlier. Numerous individuals with pulmonary tuberculosis will not reveal this quartet of symptoms until the disease has reached a stage when treatment may be of little or no avail.]

Burkard (Wien klin Wchnschr 41 1352 (Sept 20) 1928) comments on the difficulty of diagnosing tuberculosis in adults in early stages. When in doubt, he advocates repeated examinations at weekly intervals, in order to follow the progress of any symptoms or signs that appear. He offers as important, the history, the hereditary and social background of the patient. He warns that influenza may mask incipient tuberculosis. Changes in the chest formation and in action should be sought, but deep breathing should not be requested until auscultation is in progress, since the finer râles may clear up thereby. Fluctuations of temperature are of value, even though no organic disease may exist. He states that increase in the pulse rate is a bad sign, and loss or gain in weight is of

significance in diagnosis. Percussion and auscultation, according to Burkard, can be misleading, since a case with marked physical signs may be healed or stationary, and there are many variations present even in the normal chest. Shortening of the percussion note is frequently found in tuberculosis, but there may, however, be no alteration in the note early in the disease, dulness may persist harmlessly for many years if due to scars. Comparative auscultation is less reliable at the apices, because the respiratory sounds at the right apex frequently resemble more nearly a bronchial breathing even in the healthy chest.

Kaufman (Weekly Roster and Med Digest (Mar 17) 1928) criticizes the attitude of many clinicians who refuse to make a positive diagnosis of tuberculosis until the physical signs and x-ray findings are positive. He feels that early diagnosis in many instances can be made from the history of the case alone, and at times the diagnosis must be arrived at by the exclusion of other diseases. This writer points out that any patient presenting as the primary findings a pulmonary hemorrhage, pleurisy, especially with effusion, or fistula-in-ano, should be regarded as a tuberculous individual, even if not directly proven at that time. Prolonged cough or repeated colds should be exhaustively followed and cleared up. Indigestion in young persons, especially if accompanied by cough and loss of weight, may point to tuberculosis. Menstrual irregularities, especially failure of the function to present itself before the seventeenth year, may be due to tuberculosis.

Kaufman is of the opinion that the most important facts with reference to early diagnosis are found by auscultation, the most characteristic findings being localized apical suppression or roughening of breath sounds. Changes, especially prolongation and blowing, occurring on expiration are more frequent when the disease has been of longer standing, although the area of the lesion may be limited, after this, in importance, comes the detection of râles following cough. In cases with early tuberculosis the râles are heard with the cough itself and at the very beginning of inspiration following cough. In early diag-

nosis, vocal resonance is frequently slightly increased and there may be slight transmission of whispered voice sounds. Percussion will frequently be entirely negative in the early stages. Palpation and inspection are of little or no value in the early cases but may give information of important value in more advanced stages. The most important sign to be looked for, Kaufman believes, is a lagging motion of one side of the chest. Tuberculin tests may, when positive, indicate a sensitization to the tubercle bacillus and are of accessory value.

F M Pottenger (J A M A 93 1801 (Dec 7) 1929) points out that tuberculosis, while usually appearing in an insidious manner, may develop acutely, in recent years these rapidly developing cases have more often been seen. Not infrequently, the lesion is first brought to the individual's attention by an acute toxic reaction, accompanied by cough and expectoration. In many instances which are looked upon as chronic, the acute phase has been overlooked. Pottenger points out that in patients suffering from chronic tuberculosis, a previous infection has existed which produced a specific defence on the part of the patient with the acquiring of relative immunity known specifically as *allergy*. When allergy exists, the patient's body responds with an inflammatory reaction toward further tubercular foci or further inoculation. This, in turn, is the underlying cause of the symptoms and the course of the future progress upon which it depends. A mild allergic phenomena may be accompanied by a slight tissue reaction with few or no noticeable findings, whereas a severe allergic response is accompanied by marked tissue reaction, hence it is a symptom. Tubercular allergy is caused by the cellular hypersensitivity from a previous infection. The severity of the action is dependent upon the character and degree of the preceding infection, the number, the size and frequency, nature of the host's response, and the time element. When more is known of these factors and their measurements, some degree of accuracy may be arrived at regarding the later development of any particular infection.

Pottenger (*ibid*) calls attention to the fact that the symptomatology revealed in-

icates that the body of the patient is combating the bacilli, and is doing so at the expense of normal tissue and function, since no symptoms appear merely as the result of infection. It is only after the immunity mechanism has been called into play that reaction on the part of the body occurred with the evidence of illness. When this mechanism has once been produced, the disease may reveal itself after comparatively small reinoculations either of the tubercle bacilli or bacillary protein or larger ones, and all of the symptomatology and clinical findings vary accordingly.

When tuberculosis appears with an acute onset, Pottenger believes that the resultant disease is the product of a relatively large reinoculation. Accordingly then, the symptoms are more serious and the lesion present is more extensive. The acute onset many times will follow other acute infections as the childhood diseases, upper respiratory colds, influenza, and pneumonia, diminishing the patient's resistance, at which time the tubercle bacilli may become reactive again. Severity of the reaction on the part of the body will depend upon the virulence of the tubercle bacilli, their numbers, the unhealthy condition of the patient's body tissues and the degree of immunity previously called forth by allergic reaction on the part of the body tissues. The sudden appearance of symptoms causes the usual well-known toxic syndrome, with increase in temperature, rapid pulse, malaise, loss of strength and weight, nervousness, anorexia, indigestion, cough, spasticity of the shoulder girdle muscles, lagging of the one side of the chest, and sputum.

The infraclavicular pulmonary fields have in recent years been the subject of unusually careful scrutiny. A Brecke (Ztschr f Tuberk 51 97 (June) 1928) reports 7 cases in which he found a severe infraclavicular infection following a mild apical lesion. In all of the cases except one, the infection appeared to have originated directly from the apical lesion. B R Douglas, M Pinner and B Wolepor (Am Rev Tuberc 19 153 (Feb) 1929), believe that diagnostic and therapeutic measures should be directed primarily toward the acute sub-apical lesions and not always stressing the apical location of the disease.



These authors believe that apical involvement in the majority of cases is a fairly late development. They maintain that progressive and destructive pulmonary tuberculous lesions come on, as a rule, suddenly with exudative sub-apical lesions. The role played by sub-apical infiltration is of primary importance, while the apical tuberculous lesions are relatively insignificant from the standpoint of phthisiogenesis.

W J Bryan (J Missouri M A 26 580 (Dec) 1929) maintains that all primary pleuritis should be regarded as tuberculous unless proved otherwise. This holds good for hemorrhage of the lungs, although only about 50 per cent of pulmonary hemorrhages are due to tuberculosis. The cough of a patient suffering from an early tuberculosis is dry, hacking and non-productive. A loose and productive cough indicates suppurative disease of some kind, for example bronchiectasis or lung abscess. Cachexia may be due to neoplasm. Abnormal findings at pulmonary bases are more likely to be non-tubercular in origin, increased whispered voice or rough breath sounds, or rales, in the upper third of the lungs should be looked upon as tuberculous until proven otherwise. For the further diagnosis of bronchiectasis, lipiodol injections have recently proven of value. This however, cannot be looked upon as excluding a tuberculous lesion since so many times bronchiectasis is co-existent with tuberculosis.

A Graud (Presse med 37 1341 (Oct 16) 1929) believes that while certain areas of predilection exist for tuberculosis in the lungs, the lesions may be found in any part of the lungs and careful search should be made without regard to preconceived ideas of so-called pathognomonic location. He draws attention to the frequency with which lesions may exist between the clavicles and the bronchial hilum or in the infraclavicular region, whereas in the apical region the stationary lesions or only old scars may be found.

**TESTS.**—*Sputum Examination*—In an examination of more than 500 adult patients with active pulmonary tuberculosis, M Pinner and W I Werner (Am Rev Tuberc 18 490 (Oct) 1928) found positive sputum in more than 99 per cent. They maintain that the absence of tubercle

bacilli in the sputum almost always indicates healing. Negative sputum, according to these observers, has a much greater diagnostic and prognostic value than is represented by the usual teaching.

The black discoloration of sputum so frequently found in tuberculous sputum is caused, according to A Jousset (Bull et mém Soc méd d hop de Paris 53 363 (Mar 18) 1929), by the presence of flat alveolar epithelial cells which contain iron pigment. While this black sputum may be found in other pulmonary conditions such as congestion, it is more marked in pulmonary tuberculosis because of hemorrhages which, incidentally, may be occult. Jousset thinks that the black sputum is a sign of good prognosis, because the degree of the black discoloration of the sputum, in his opinion, is inversely proportional to the number of tubercle bacilli present, and because the greatest number of the iron containing cells is observed in the chronic form of pulmonary tuberculosis, showing a slow development and a tendency to fibrosis.

I Rappaport (J Lab and Clin Med 15 1 (Oct) 1929) regards the appearance of elastic tissue in sputum as of the greatest significance, indicating the presence of bacilli. In his experience, such cases revealed progress to slow cavitation, the course of which was chronic but definitely destructive finally. The longer such elastic tissue is found in the sputum, the less chance has the patient of spontaneous recovery. On the other hand, in cases showing chronic low grade infection in which sputum revealed gradual disappearance of the elastic tissue fibers, even with presence of tubercular bacilli, the x-rays showed definite signs of absorption, with more or less delay of the advance of the process and, finally, clinical arrest of the disease. Rappaport believes he can make a diagnosis of the particular phase or type of tuberculosis present from the sputum examination alone.

P Moxey (Practitioner 123 142 (Aug) 1929) believes that more reliance can be placed on the result of the examination of the sputum for the presence of albumin than for the presence of tubercle bacilli. In all cases examined by him in which the bacteria were present, albumin also was



present The amount of albumin as estimated by the Esbach test is proportionate to the numbers of bacteria present Moxey thinks it rational that if albumin is always present when tubercle bacilli are found, the presence of albumin, even if the bacilli are not detected, must be of considerable importance in the diagnosis of tuberculous pulmonary lesions and in actual practice, in his experience he has found this to be true Examination of 2500 sputums showed that approximately 25 per cent possessed both bacteria and albumin In about 50 per cent albumin alone was found, and in the other 50 per cent both were absent In the past 4 years, Moxey observed only 2 cases in which bacilli were present and albumin was absent, and in both of these cases albumin was noted when a second test was made

Negative sputum examinations may be due, according to J W Dundas-Grant (Brit M J 1 627 (Apr 14) 1928), to the fact that a good specimen of sputum has not been received, since many patients are unable to raise the fluid from the bronchi, but involuntarily swallow and expectorate little more than frothy saliva from the mouth He advocates provoking an active cough reflex by having the patient sniff the vapor of *volatile oil of mustard* from the neck of a bottle which has been warmed Two or 3 sniffs generally cause a good cough with the expulsion of sputum from the larynx and trachea When this does not bring about results, Dundas-Grant advocates intralaryngeal injection through a syringe of a few drops of a weak *sodium bicarbonate solution*, to which has been added a little *hydrogen peroxide*, using the laryngeal mirror If this fails, due to an irritable larynx, he uses *transnasal instillation* for the introduction of oily solutions into the larynx The patient is seated with head thrown back, mouth wide open, rapidly breathing in and out through the mouth, when about  $\frac{1}{2}$  dram (2 cc) of the soda and peroxide solution, drop by drop, is syringed through the nose This usually results in raising a sputum which contains tubercle bacilli

C G Ransom (J Tennessee M A 21 381 (Feb) 1929) used *safranin* instead of carbol fuchsin for the demonstration of tubercle bacilli The solution is made up

of 100 cc ( $3\frac{1}{2}$  ounces) of distilled H<sub>2</sub>O, 10 cc ( $2\frac{1}{2}$  drams) of tenth-normal solution of sodium hydroxide, or 1 cc (16 minims) of a normal solution and 4 Gm (1 dram) of safranin The solution is easily made up and is more stable and less liable to precipitation The bacteria come out as a brilliant red over a dull deep red Ransom believes that there is less likelihood of overlooking tubercle bacilli with this new stain

*Pirquet Test*—C A Stewart (Am J Dis Child 35 388 (Mar) 1928) suggests that the most effective way of using the Pirquet test is to make a single puncture with an ordinary sewing needle and to penetrate the epithelium through a drop of tuberculin on the skin This method he believes may be performed more rapidly and is less objectionable to the child than the scarification method After puncturing the epithelium through the drop of tuberculin, the excess tuberculin may be wiped off immediately without altering the effect of the test When using this method, Stewart found 100 per cent positive reaction in 223 children who gave positive reaction with the scarification method He also noted that when the needle was used in making the puncture through 2 separate drops of tuberculin on the forearm, the second site of puncture often produced the most pronounced reaction

*Blood Sedimentation Test*—H A Clegg (Tubercle 10 205 (Feb) 1929) believes that the sedimentation rate of red blood cells in pulmonary tuberculosis is an accurate measure of the activity of a lesion, and useful in ascertaining the diagnosis and prognosis The lower the rate, according to Clegg, the worse the prognosis Patients with a rate around 8 or 9 showed slight but definite signs of activity, and responded well to rest and mild exercise With a rate between 6 and 8, signs and symptoms of tuberculosis were more marked, but only 1 case showed progression of the lesion Patients with a sedimentation rate between 4.8 and 4 became progressively worse, showing no response to treatment

J A Langer (Beitr z Klin d Tuberk 71 206 (Jan 24) 1929) performed the sedimentation test over 500 times, before and during menstruation, in 175 women suffer-

ing with pulmonary tuberculosis, and found that normal menstruation in no way affects the sedimentation rate. When marked changes in the rate are found, he attributes them to other factors than menstruation.

R. R. Trail and D. M. Stone (Lancet 1.179 (Jan 26) 1929) advised guarded prognosis in the case of pulmonary tuberculosis which shows a high initial sedimentation rate (over 30 per cent), as nearly half of these cases show no satisfactory response without some special form of treatment. However, in cases with a sedimentation rate under 30 per cent, the outlook is more favorable, and appears to be independent of the initial presence or absence of bacilli in the sputum. These authors state that during the first 3 months in the sanatorium, the sedimentation rate changes indicate not only that the patient is responding to treatment, but the rate at which improvement is occurring, and, therefore, the final chance for recovery. When artificial pneumothorax is used, or after hemoptysis, or when gold treatment is being given, as well as in the initial stages of exercise, the sedimentation rate can be used to follow the patient's progress in minute manner. It frequently indicates the onset of complications before they become otherwise apparent.

The sedimentation test is interpreted by J. W. Tappan and G. H. Faget (Southwestern Med 13 105 (Mar) 1929), as a measure of tissue destruction, and they believe that the sedimentation velocity is directly proportionate to the anatomic involvement, being more marked in far advanced and less marked in early or slight cases. In the fibroid types of pulmonary involvement, the sedimentation test approaches the normal, whereas in patients with positive sputum, high pulse rate, fever, loss of weight and a progressive lesion, the index of activity is more rapid. In the exudative lesion the rate is very fast as a rule. A persistently rapid sedimentation rate points to a poor prognosis, especially if the rate is constantly within 30 minutes. All of the patients in the series examined by these investigators whose lesions prove fatal had an erythrocyte sedimentation of less than 1 hour, and more

than 75 per cent of the fatal cases showed a time within the first 30 minutes. A falling sedimentation rate indicates a progression of the lesion and is a danger signal. It frequently reveals renewed activity long before such symptoms as loss of weight, increase in the pulse rate, fever, increased sputum and exterior findings occur. The changes in the blood sedimentation rate should always be known before exercise is prescribed.

**FLUOROSCOPIC AND X-RAY EXAMINATION**—A. C. Reid (Am Rev Tuberc 20 46 (July) 1929) is of the opinion that early and benign tuberculosis, as well as more advanced lesions, are always visible with the roentgenoscope. On examination of nearly 5000 individuals, he found 121 per cent, who had had been passed as physically normal, to show pulmonary lesions classified later as anatomical tuberculosis. Of these 59 patients, 35 returned later, and 16 of these were found to be suffering from active progressive tuberculosis.

**PROPHYLAXIS AND TREATMENT**—To understand the healing processes in tuberculosis, F. M. Pottenger (Am Rev Tuberc 17 459 (May) 1928) states that the physician in charge must know and understand the immunity reactions which accompany the disease. The key to understanding the healing process is an appreciation of the fundamental difference between primary infection and reinfection, and the difference in the body's reaction toward these several processes. Every therapeutic measure resorted to must either increase and build up the patient's immunity mechanism or stimulate those natural factors in his defensive mechanism which favor healing, if the patient is to improve. Any measure which improves the general physiologic body equilibrium such as rest, exercise, open air, sunlight, good food, baths, etc., is valuable to the extent that it aids the patient in developing a competent defense and maintenance of a proper physiologic balance.

The work of A. Calmette, C. Guérin and B. Weill-Hallé (Bull Acad de med 91 787 (June 24) 1924) offers some hope in the prevention of pulmonary tuberculosis. He advocates giving 3 oil doses of 0.01 mg of B. C. G. culture obtained by attenu-

ating the virulence of bovine bacilli, the first week of life. Since the appearance of Calmette's original theses, his work has been investigated by clinics and laboratories throughout the scientific world. The Ukrainian Commission (Ann de l'Inst. Pasteur 42 246 (Mar) 1928) experimenting with the bacillus Calmette-Guérin vaccine offers the following conclusions: (1) Calmette-Guérin bacilli injected in small or large doses into healthy or weakened guinea-pigs produces only localized lesions with a retrogressive tendency, even successive passages from one animal to another never cause a progressive tuberculous lesion, (2) B C G introduced into guinea-pigs which are thereafter subjected to repeated injections of tuberculin do not increase in virulence, (3) cultures of B C G isolated after 1 or 2 passages in the guinea-pig were not virulent, (4) the tissue culture method permits demonstration of the non-virulence of B C G, (5) vaccination of laboratory rodents gives relatively good results, (6) vaccination of cattle with B C G confers a definite resistance to experimental intravenous injection of virulent tubercle bacilli, (7) the B C G eliminated in the milk of cows is completely avirulent, (8) studies made over a period of more than 2 years show that the use of B C G for the preventive vaccination of new-born infants is harmless. The low mortality from tuberculosis observed in vaccinated infants in a tuberculous area is in favor of the use of the Calmette-Guérin method.

Pirquet and Moro believe that since B C G by mouth does not cause allergy, it cannot, therefore, produce an immunity. Moro warns, however, that even with the contradiction of the present theories, Calmette's results should not be too severely questioned.

J. Troisier, S. Develay and J. Weiss-Roudinesco (Presse méd 37 137 (Jan 30) 1929) obtained a positive tuberculin reaction in only 60 per cent of old men over 80 years of age. In order to ascertain whether this was due to the absence of tubercle infection or to senility, the authors administered 0.02 mg of B C G subcutaneously to 10 octogenarians who had given a negative Pirquet reaction. Four months after the injection of B C G

all of these patients gave a positive tuberculin reaction. Since tuberculosis may begin in individuals over 60, these investigators advocate preventive vaccination in all adults and even in old people. He has had considerable experience with bacillus Calmette-Guérin.

C. Kereszturi (Am Rev Tuberc 20 297 (Sept) 1929) has arrived at the following conclusions: (1) **Oral vaccination**, using B C G, is relatively simple, (2) it is harmless, (3) it gives some immunity, (4) the degree and duration of immunity have not as yet been ascertained.

Believing in the evolution and mutation of all living bacteria, S. A. Petroff (Am Rev Tuberc 20 275 (Sept) 1929) is opposed to the adoption of any method of prophylactic immunization that recommends the use of a living bacterium. He concludes that since infants may become infected with a virulent microbe and develop a late tuberculous lesion which will be manifested clinically only later in life, he sees no reason to suppose that the same events should not occur if infants are infected with *Bacillus Calmette-Guérin*. He states that there is evidence to prove that such a catastrophe may happen. He believes that, at best, the acquired resistance obtained by use of a microorganism of the B C G character will be of a low degree. If a vaccine must be used, Petroff maintains that one made up of dead microorganisms can accomplish just as much as the low virulent B C G.

F. Gómez and J. C. Negro (Semana med 36 407 (Aug 8) 1929) treated 62 tuberculous patients with B C G vaccine. The injections were made subcutaneously in 12 patients, intravenously in 45, and both intravenously and subcutaneously in 5 other patients. Dosage varied from 0.01 mg of B C G for the first 3 injections, then 0.005 mg for 10 additional inoculations. The injections were given at 3-day intervals. None of the individuals showed any local, focal or general reaction other than rare abscess formation or slight fever. From their observation, these investigators believe that with the disappearance of the fear of local or general phenomena caused by B C G in tubercular patients, the question comes up as to whether or not this vaccine should be given to all in-

dividuals, regardless of age and presence or absence of positive tuberculous skin reaction. Healthy individuals with negative skin reaction might be immunized, and the resistance of tuberculous individuals in a condition of allergy could be raised by the administration of attenuated virus. These writers believe that by this method, latent tuberculous lesions should be overcome.

Comparing the immunity conferred on guinea-pigs by the subcutaneous injection of virulent human tubercle bacilli with that conferred by the subcutaneous injection of B C G vaccine, E Rist and J Misiewicz (Ann de l'Inst Pasteur 42 945 (Aug) 1928) found that the relative immunities conferred by subcutaneous inoculations of the former is of the same nature as immunities conferred by B C G. The only difference between the two is, that the immunity produced by B C G vaccine is more lasting and, although only relative, is of a much higher degree than the immunity using the human tubercle bacilli.

A Calmette (Ann de med 25 293 (Apr) 1929) recalls that it was on the basis of the experimental observation made 25 years ago by himself and Guérin that the Viennese pediatricians advanced a theory that immunity against tuberculosis could not exist without tuberculin allergy. He goes on to state that at this time, evidence points to the fact that immunity against tuberculosis does exist without tuberculin allergy. Using calves he injected 50 mg of B C G subcutaneously, or 20 mg intravenously. These animals were then subjected to the tuberculin test regularly for 6 months. Calmette found that all of the 6 calves that had received B C G intravenously, lost their tuberculin allergy between the second and sixth month, whereas 6 other calves that had received the B C G subcutaneously remained allergic for about a year. Following this, Calmette made injections of virulent bacilli in the animals that had lost their allergy, in dosages sufficient to cause the control animals of the same age to develop acute tuberculous lesions, with a fatal result in about 4 to 6 weeks. The animals resisted the large infective dosages perfectly and only a localized stationary, relatively benign, lesion developed. In these animals, then, Calmette believes that

the immunity against tuberculosis persisted, whereas the allergy disappeared. On the other hand, if the calves that received intravenous intracardiac injections of from 5 to 10 mg of B C G 1 month previously were inoculated with virulent bacilli, even though they do not show tuberculin allergy, they react like vaccinated animals and survive the virulent infection much longer than control animals. In these experiments Calmette shows that the state of immunity precedes the state of allergy.

After reviewing a considerable amount of the experimental and clinical work done with the *Bacillus Calmette-Guérin*, Gerald B Webb (J A M A 93 1459 (Nov) 1929) states that practically all independent reports coming from different countries have been favorable to the use of B C G. After a careful survey of the literature and from his own personal investigations and experiments with B C G, he thinks that it should be given to infants born to parents with open pulmonary tuberculous lesions. After further study regarding the harmlessness and efficiency of the vaccine, it may be found that all newborn infants should be vaccinated against tuberculous lesions with B C G.

*Hemoptysis*—L Lindt (Med Klin Berlin 25 1095 (July 12) 1929) advocates the intravenous injection of calcium chloride, giving 5 c c (80 minims) of a 10 per cent solution of sodium chloride, with 5 c c (80 minims) of a 10 per cent solution of calcium chloride. When given 10 c c (2½ drams) of a 10 per cent solution of calcium chloride, numerous patients complain of vertigo, headache and vomiting. The smaller dose of calcium chloride with sodium chloride is therefore preferred, since it never causes any complications. Sodium chloride also produces a more rapid coagulation of the blood, whereas, the action of calcium chloride lasts longer. Injections should be given twice during the first 24 hours, but may be given 3 times. If the hemorrhage still continues, Lindt advocated subcutaneous or intramuscular injections of 5 to 10 c c (1¼ to 2½ drams) of a 20 per cent solution of camphor. Internal administration of gelatin may be useful. Calcium preparations

should never be given orally, since they very frequently cause gastric disturbances.

**Circulatory Weakness**—J Poras (Ztschr f Kreislaufforsch 21 121 (Mar 1) 1929), states that in treating circulatory weakness in patients suffering from pulmonary phthisis, **strophanthin** should be given only in very severe cases and, if used, administered intravenously. **Digitalis** should be used in cases suffering from cardiac insufficiency. For marked vasomotor weakness, a water-soluble preparation of **camphor** or **strychnine**, from 0.001 to 0.003 Gm ( $\frac{1}{60}$  to  $\frac{1}{20}$  grain) subcutaneously, may be of value. In the other cases, the entire circulatory apparatus should be supported and for these individuals the drugs to be used are **scilla**, **adonis** and **convallaria**. The latter drug, somewhat resembling digitalis, and the sedatives may prove valuable in circulatory weakness.

**DIET**—In an exhaustive summary of the dietary facts with regard to treatment of tuberculous patients, J B Hawes, 2d (J A M A 93 452 (Aug 10) 1929) offers the following conclusions: (1) The average patient enjoys eating more and takes a larger quantity of nutrition when he confines himself to 3 good meals daily, and, therefore, lunches between meals are inadvisable, (2) egg-nogs in any form at any time are an invention of the devil, (3) raw eggs, when easily borne and with the patient underweight, are not harmful, and may furnish some strength. They are not as digestible as cooked eggs and on the whole are rarely necessary, (4) about 1 quart of milk daily, 4 or 5 glasses with meals, is the maximum amount that should be given. A glass of milk with each meal is usually enough, (5) there is no special type of food that need be emphasized. Fruit and vegetables will assist in the correction of constipation, and these foods also contain vitamins. Potatoes, macaroni and rice contain much food value, (6) the bowels should be kept open daily. For this a mild laxative, once a week, is frequently necessary. Also plenty of roughage should be included in the diet, (7) five or 6 glasses of water daily, with and between meals, is advisable for each patient, (8) rest before and following each meal is essential. To approach and leave each meal in a rested

condition, according to Hawes, is extremely good advice.

An editorial (Lancet 2 617 (Sept. 21) 1929) draws attention to the fact that *overfeeding* may be actually *harmful* in patients suffering from pulmonary tuberculosis. The information that limitation in carbohydrate intake may be beneficial is in accord with the experimental work of Weigert, Anderson and Finkelstein. A moderate protein allowance is advocated by McCann, Martin and others who have found the optimum amount for tuberculosis patients in bed to be between 60 and 90 Gm (2 and 3 ounces) protein per day. The value of a relatively high fat and lipid content of the diet is nowhere denied, and a sufficiency of vitamins is of extreme importance. There is, on the other hand, no certain evidence that an excess of vitamins or fat may influence favorably the body's resistance to tuberculosis. The influence of mineral salts may well be of vital importance. Inorganic salts in a diet, through their influence upon metabolism, and more particularly upon water metabolism are capable of affecting, adversely or favorably, bodily processes in disease. A liability to infection appears to be closely allied to the water content of the tissues, as noted in the poor resistance of edematous tissues. Sodium chloride restriction may lead to removal of water from the body, and it may be that variations in mineral salts might in some way affect the actual reaction of the blood and tissues themselves. It is conceivable that an alkaline or an acid diet might be used to shift the acid-base equilibrium of the blood or tissue fluids one way or the other. Sodium, whether chloride or carbonate, may act as a water retainer, whereas, calcium and magnesium are diuretic.

The drying up of tissues has been used as a principal in the treatment of many exudative lesions, and the value of fluid and salt restrictions have repeatedly been proven. On the basis of these findings, Gerson of Bielefeld, Germany, has proposed a partially salt-free diet for the treatment of tuberculosis. According to A Herrmannsdorfer (Med Klin 25 1235 (Aug 9) 1929), Gerson's diet eliminates the use of salt. He feels that carbohydrates should be given as little as possible, while

fats and proteins may be used in large amounts. With the elimination of sodium chloride from the diet, the sodium content of the food is considerably diminished, but since the diet furnishes large amounts of vegetables and fruits, the amount of potassium is comparatively high. Calcium and magnesium are given in the form of medicine. For sufficient vitamins, cod-liver oil, fruits and vegetables served raw are given when possible.

The dietary treatment appears especially applicable in patients suffering from tuberculosis of the skin, lymph nodes and the bones, in which cases inflammations, wounds, fistulas and edema gradually diminish and finally disappear. In patients suffering from pulmonary lesions the results are not always apparent, but even in these, the general condition improved.

Investigating the **Gerson dietary treatment**, E. Schwalm (Klin Wchnschr 8 1941 (Oct 15) 1929) found that it was of no especial benefit in the treatment of 20 patients with pulmonary tuberculosis. The sedimentation speed and the blood picture showed no changes.

In treating undernourished tuberculous patients, H. G. Zelter (Ztschr f Tuberk 52 191 (Oct) 1928) used **forced feeding** and **insulin** in 10 cases of pulmonary tuberculosis. The duration of the treatment lasted from 3 to 4 weeks. On the first day he gave 5 units of insulin, on the second day, 2 doses of 5 units each, and on the third day, 20 units were injected in 2 doses. The doses were then increased by 10 units daily, up to a maximum of 60 units. From his experience, Zelter finds that the entire metabolism of the patients is raised and weight increases. The blood sugar curve falls slightly which shows that the carbohydrates are used more effectively. Increased water retention and serious complications were absent in Zelter's series.

#### **SPLEEN AND SPLENIC EXTRACT.**

—M. Bayle (Presse med 36 1563 (Dec 8) 1928) gave whole pig spleen extract hypodermically in severe cases of tuberculosis with a fatal prognosis, and in which all forms of other treatment had proved ineffective or were contraindicated. In his series of cases, Bayle found there was an increase of the erythrocytes, in the hemoglobin percentage and in weight, with a

diminution or complete cessation of cough, expectoration and fever. Regression, often to the point of complete cicatrization of the lesions, with diminution and disappearance of the tubercle bacilli in the sputum occurred. From his findings, Bayle concludes that splenic extract should have a place in the treatment since it is effective and always contributes to the general welfare of the patient. It increases the defensive powers of the organism, favoring the healing of the lesions, and the disappearance of the bacteria.

Delille (Monde méd 38 669 (July 15) 1928) finds that spleen extract produces a considerable improvement in a large number of patients regarded as hopelessly ill, the x-ray plates revealing a diminution in the severity of the lesions. Delille advises the extract be given in 3 injections weekly, of 3 to 5 cc each. P. Ruttgers and A. Kamsler (Beitr z Klin d Tuberk 72 68 (May 17) 1929) also are enthusiastic about the use of a spleen diet in cases of tuberculosis where other forms of treatment have proven of no avail. While the tubercle bacilli persisted in the sputum, nevertheless general improvement occurred and in many instances requiring surgery, the patient became sufficiently strong to permit this treatment. Improvement was shown by the general condition, the blood picture, an increase in the body weight, in addition to an increase in resistance. The authors, from their findings, state that there is a relation between the spleen and the lungs and tuberculosis.

**LIPOID THERAPY**—The following conclusions are offered by J. E. Wolf (Schweiz med Wchnschr 58 959 (Sept 29) 1928). Tuberculosis, unlike other diseases, is suitable for fat or lipoid therapy and, hence, for the treatment with the non-specific fat stimulating body—**lipatren**. The lipoid bodies, in the form of antifats and antilipoids, play a predominant part in immunity processes. The lipoids are the chief carriers of both the specific and non-specific factors of immunity. Both types may be affected by properly dosed stimulation therapy. On the other hand, the lipoid bodies, aside from their toxin binding and bactericidal effects, possess definite general therapeutic properties. Fermentative reactions are stimulated, the deposi-

tion of albumin is favored and the blood lipoids are increased, which facts furnish a logical basis for the use of lipid therapy in tuberculosis. Favorable results may be obtained, as shown by Wolf, overdosage, however, may cause some harm.

**CALCIUM**—From a study of 150 patients suffering from pulmonary tuberculosis, F. Becker (*Ztschr f Tuberk* 53: 198 (Apr) 1929) advocates the intravenous administration of calcium preparations and states that it is particularly effective in bilateral pulmonary tuberculosis, besides being harmless. J. C. Hoyle (*Quart J Med* 22: 451 (Apr) 1929) states that from the experimental point of view, intravenous administration of calcium has no effect in prolonging the course of the disease in a moderately rapid infection. He states that experimental evidence is lacking to suggest that calcium has any direct therapeutic action on the course of the disease.

The calcium content and erythrocyte sedimentation rate after oral ingestion of calcium has been determined by T. Sternberg (*Beitr z Klin d Tuberk* 71: 737 (Apr 25) 1929). Several patients showed an increase of the sedimentation and a lowering of the calcium content. This writer maintains that the effect of calcium injections is an indirect result of activation of ferments, stimulation of the leukocyte and general antitoxic action, as well as remineralization. The action of calcium is further enhanced if phosphorus, endocrine therapy and vitamins are added, to improve the power of assimilation and retention of the calcium.

P. Ellman (*Tubercle* 10: 257 (Mar) 1929) finds that a definite relationship exists between pulmonary tuberculosis on one hand, and calcium metabolism and parathyroid therapy on the other. He states that the calcium content of the blood serum in patients suffering from pulmonary tuberculosis varies only within normal limits and is from 9 to 12 mg per 100 cc of blood. The supposed calcium diminution in the blood has not been confirmed. In patients who react favorably, the calcium content can be elevated, but only within the normal maximum limit. According to Ellman, the object in view in treating these patients with calcium or parathyroid therapy is to endeavor to raise

the blood calcium to its maximum concentration point, and the preparations must be given over a prolonged period of time. Microscopic examination of the parathyroid gland shows signs of increased functional activity of the glands.

**SANOCRY SIN or GOLD THERAPY.**—L. Bernard and C. Mayer (*Bull Acad de med, Paris* 101: 403 (Mar 19) 1929) conclude from their experiments and observations that sanocrysin exerts a favorable influence on the healing process of tuberculosis, especially in the acute and progressing reproductive stages. Of 142 acute cases, 62, or 43 per cent, showed improvement following the gold therapy. There was a marked contrast to the less than 5 per cent of spontaneous improvement in cases from other hospital services. The benefits derived from the gold salts included a fall of temperature, weight gain, general increase in well being, diminution of the functional findings and a slight amelioration of the physical signs. The x-rays showed some improvement also. A sclerosis was noted, the shadows becoming more marked with a diminution in the extent of the lesions. Systemic reaction from the administration of the drug, such as slight rise in the temperature, albuminuria, dermatitis or digestive disturbances, as vomiting, abdominal pains and diarrhea, may occur. Sanocrysin treatment is contraindicated in cases of diarrhea or albuminuria. In the acute febrile cases, 0.25 Gm (4 grains) is injected during the first week and 0.5 Gm (7½ grains) during the second. According to the condition of the patient, this may be continued or increased to 0.75 Gm (12 grains). The total amount injected varies from 5 to 7.5 Gm (1¼ to 2 drams). In afebrile cases 0.25 Gm (4 grains) is given and this should not be increased.

From a considerable survey of the literature in reference to sanocrysin treatment for tuberculosis the results are so conflicting that at the present time this treatment cannot be universally advocated.

**X-RAYS**—According to T. Abramowitsch and I. Rabuchin (*Ztschr f Tuberk* 51: 462 (Aug) 1928) x-ray treatment is valuable in cases of pulmonary tuberculosis who are suffering from a moderate amount of toxemia. Those revealing an advanced



degree of toxemia, with a low degree of toxemia, should not be given x-ray therapy because in them, the action of tuberculin appears to be increased, rather than decreased. Their observations covered a series of 78 patients who received intracutaneous injections of Koch's old tuberculin, the variation of the biologic properties of this tuberculin being judged by the size and tensivity of the skin reaction.

H. Deicher and E. Lachmann (Beitr. z. Klin. d. Tuberk. 71 98 (Dec. 21) 1928) concludes that x-ray therapy is of very little value. In 37 cases with a fibrous chronic form of pulmonary tuberculosis, with slow development and no fever, with or without cavities, after prolonged x-ray treatment, combined with ultra-violet radiation and the administration of silicic acid preparations, improvement was noted in 22 patients, with no effect in 3, and in 12 patients the tuberculosis was aggravated. In only 12 of the patients who showed any improvement did this improvement persist more than from 1 to 1½ years.

It would appear, from a fairly extensive survey of the recent literature regarding the usefulness of x-ray therapy in the treatment of tuberculosis, that this agent has not unequivocally proven its merit.

**HELIOOTHERAPY**—This method of treatment has been fairly extensively tried and investigated within the past few years. While its original indications appeared to be only for the so-called surgical forms of tuberculosis as advocated by Rollier in Switzerland and apparently contraindicated in pulmonary tuberculosis, it appears that a method which acts as a specific in some tuberculous lesions should also exert a beneficial influence on other forms. E. S. Bullock (Am. Rev. Tuberc. 17 375 (Apr.) 1928) maintains that cases should be of the productive, rather than the exudative, type of pulmonary lesion before the decision to use heliotherapy should be made. W. C. Pollock (Am. Rev. Tuberc. 14 505 (Nov.) 1926) advises heliotherapy for those convalescent cases which have fibrosis of the foci. J. R. Earp (Colorado Med. 26 245 (July) 1929) considers that one of the chief reasons why physicians hesitate to advise the sun treatment is fear that it may cause hemoptysis. The question of dosage, whether it should be large or small, is

probably the deciding factor. When I. D. Bronfin (Am. Rev. Tuberc. 11 96 (Apr.) 1925), notes that in patients complaining of vertigo, headache, palpitation or indigestion, he reduces the dosage of sunlight and later raises it. Only if the symptoms persist, does he abandon the idea of heliotherapy. Earp states that the most successful results in heliotherapy have been obtained by those investigators who use small dosages, gradually increasing the exposure with great precaution. This writer further states that any discussion of heliotherapy should include details concerning the cooling power of the air, the heat of the sunshine, or the intensity of the light. He suggests temperature reading, the use of Hill's ketathermometer for measuring the cooling power of the air (Med. Research Council, No. 73, 1923) and the measurement of the ultraviolet light by the method of Janet H. Clark (Am. J. Hyg. 9 646 (May) 1929), which consists essentially in using a mixture of high temperature zinc sulphide ground in a mortar with a saturated solution of lead acetate.

In summing up his theories concerning the evaluation of heliotherapy in tuberculosis, S. H. Watson (Arch. Physical Therapy 10 252 (June) 1929) makes the following statements: (1) Heliotherapy is not indicated in all cases of tuberculosis, (2) it is not a cure for any type of tuberculosis, (3) since it is not a cure, it should never be used to the exclusion of the usual standard therapeutic measures, (4) the direct rays of the sun are extremely powerful, and, if carelessly administered, can effect great harm, (5) direct sunlight in the same amount affects patients differently, (6) since this is true, it must be used in every case according to the individual reaction and requirements, (7) heliotherapy is of the greatest value in pure extra-pulmonary tuberculous lesions, *i.e.*, the surgical tuberculous lesions in which no pulmonary lesion is present, (8) it is also valuable in extra-pulmonary tuberculosis with coincident pulmonary lesions, but in using it, care must be exercised, especially as regards exposing the thorax, (9) heliotherapy is valuable in hilum gland tuberculosis and should invariably be used for this type, (10) it offers some value in some



cases of a proliferative type of pure pulmonary tuberculosis, but here, again must be used with the greatest caution, (11) it is virtually never of any value, and may be positively harmful, in the exudative type of pure pulmonary tuberculosis, (12) in whatever type of tuberculosis heliotherapy is utilized, it should always leave the patient feeling the same, or better, both during and after the sun bath

After observing a series of 220 cases of pulmonary tuberculosis, uncomplicated by any evident extra-pulmonary, bone, joint or lymph node lesion, A T Laird arrives at the sensible conclusion that the results of heliotherapy are not likely to be spectacular, and its omission is not necessarily detrimental to the patient's best interest (Am Rev Tuberc 18 80 (July) 1928)

E Mayer (J A M A 89 361 (July 30) 1927) discusses the physical characteristic of light, its photobiological effect, sunlight *versus* carbon arc and quartz mercury vapor light, the development of pigment in reference to light therapy, dosage and technic, as well as the clinical results, and concludes that the indications for the therapeutic use of the various dosage of light are still inexact and that the dosage of light cannot be fixed. The principal guide in light therapy are the signs and symptoms and skin reaction developing in response to the exposures. In most forms of progressive acute tuberculosis, except those of the intestines, Mayer states that light therapy is not indicated. In any form of tuberculosis, light is used merely as an adjuvant, and should be combined with rest, good food and hygienic outdoor life. This writer observed the most favorable response to sunlight in the so-called pretuberculosis of children, and in tuberculosis of the lymph nodes, pleura, joints, bones, peritoneum and intestines. The best results from the use of carbon arc have been obtained in cutaneous, bone and joint, lymph node, peritoneal and eye tuberculosis. Using the quartz mercury vapor light, the most favorable results were found in intestinal tuberculosis, hilum-glandular or so-called hidden tuberculosis, cutaneous, pharyngeal, ocular, lymph node and peritoneal forms.

**AIR BATHS**—G S McCarty (U S Vet Bur M Bull 4 832 (Oct) 1928) ad-

vises air bathing minus sunlight and found it of advantage in the treatment of more than 300 cases. It encourages a patient to rest since when entirely stripped of his clothing, he is not so likely to arise and wander around, having been worn out both in mind and body, and rather discouraged a patient feels that something is being done for him and continues the rest. After he has tried this form of treatment for a short period the skin loses its pallor and its flaccid appearance, becomes bronzed to some extent, more elastic, and shows a better color. The patient realizes a change is taking place and this assists him psychologically. By the increased elimination of carbon dioxide through the skin, the lung attains more nearly that stage of rest so highly desired. In the 300 cases observed by McCarty, no further tonics were required to aid digestion and several patients who had previously complained of insomnia did not require further administrations of sedatives.

#### **ARTIFICIAL PNEUMOTHORAX**—

G Baer (Zeit fur Tuberc 51 12 (May) 1928) discusses the results obtained in the treatment of a series of cases with artificial pneumothorax and states that permanent results were obtained in about 30 per cent. The treatment is more likely to be successful if no adhesions are present. It is indicated particularly in cases of early cavities that do not yield to conservative treatment. Baer believes that this form of treatment has the advantage economically of restoring the patient's ability to work within a relatively short time.

G F Fernandez (Noticias Medicas (Sept) 1927) states that artificial pneumothorax is the ideal treatment, when possible, for *hemoptysis* of tuberculous origin, since the method of action tends to compress the bleeding focus. Fernandez advocates puncture in the fifth axillary line in any of the intercostal spaces, avoiding of course the region of the heart.

**Adrenalin** should always be on hand, to be injected hypodermically at the slightest sign of shock. The gas employed by the writer at the first puncture was oxygen, since there is less danger of gas embolism, due to the fact that this gas is more soluble and diffusible in the blood than is nitrogen gas. At the first injection, 600 c.c. of

oxygen is injected and the next day, instead of oxygen, nitrogen can be used with safety

F de Egaña (Mediber 1 369 (Apr 7) 1928) found that 25 of 28 patients with pulmonary hemorrhage reacted favorably to treatment by artificial pneumothorax. In 2 of the patients the hemorrhage persisted, whereas in 2 others, the hemostatic action of the pneumothorax was slight, in 60 per cent the creation of a partial pneumothorax was sufficient to stop the bleeding. From these results de Egaña concludes that pneumothorax is useful in cases of uncontrollable hemoptysis.

V Bonomo (Policlinico (sez chir) 35 289 (June) 1928) believes that the most reliable criterion for determining the ordinary respiratory capacity and diagnosing respiratory insufficiency is the measurement of the tidal air. In pulmonary tuberculosis, examination of the respiratory function, through study of the mechanism of respiration, results usually in a marked decrease in the cases of supposed respiratory insufficiency. Bonomo believes that this disturbance is not associated with reduction of the respiratory area, but with toxic stimulation of the respiratory center. He thinks the proof that dyspnea is not due to impaired respiratory function lies in its progressive diminution and disappearance, as a result of the application of collapse therapy, and notwithstanding the reduction of the respiratory area that are brought about. L Dunner and S Spiro (Ztschr f Tuberk 53 431 (May) 1929) report good results with the use of bilateral pneumothorax in treating 16 cases. In 6 of the patients both sides of the thorax were punctured at different times, whereas in 10, the operation was performed at the same time.

The modern surgical treatment of pulmonary tuberculosis, according to A Ochsner (New Orleans M and S J 81 876 (June) 1929), consists in an attempt to immobilize the affected lung, producing as effectively as possible physiological rest, without interfering with the nutrition of the lung. The blood supply from the bronchial arteries to the lung is probably not so materially decreased as the result of the pulmonary collapse. After artificial pneumothorax, the function of the lung

and the physiological demand upon it for oxygenating blood are decreased, whereas the general circulation from which the lungs receive their nutrition is not altered. From this, the beneficial effects produced by artificial pneumothorax are quite evident. Ochsner outlines the indications for artificial pneumothorax as (1) Unilateral pulmonary tuberculosis, (2) severe pulmonary hemorrhage, (3) spontaneous pneumothorax after complete absorption of the air, and (4) the pleural exudate and tuberculous empyema. He outlines the contraindications as (1) An extensive process active in both lungs, (2) an extensive chronic non-tuberculous process in both lungs, such as chronic bronchitis, bronchiectasis, emphysema, asthma and pleurisy, (3) severe intestinal tuberculosis, (4) advanced diabetes mellitus, and (5) advanced cardiorenal disease. The complications of artificial pneumothorax are pleural shock, perforation of the lung, and pleurisy. Ochsner believes that the majority of cases of so-called pleural shock are in reality cases due to air embolism. (See also PNEUMOTHORAX, ARTIFICIAL, this volume.)

**PHRENICECTOMY**—Section of the phrenic nerve produces a paralysis and elevation of the diaphragm, with limitation of respiratory activities on the side on which it is performed. It can, therefore, be seen that the favorable effects upon healing are similar to those obtained from thoracoplasty. Phrenicectomy is not ordinarily followed by any adverse symptoms, unless part of the vagus nerve has been injured at the operation.

A Perera (Progresos de la clínica 35 335 (May) 1927) points out that phrenicectomy may be difficult because of anatomical anomalies. In some instances, the operation will be incomplete because of the presence of anomalous branches of the phrenic nerve, or it may be buried in adhesions. Traction should be exerted on the phrenic nerve and the section done at its lowermost part. The subclavian branch should be destroyed by dissection. Search should always be made for an accessory phrenic nerve.

H Maendl and E Schwarzmann (Beitr z Klin d Tuberk 71 80 (Dec 21) 1928), performed phrenicectomy with no other

surgical intervention in 46 individuals suffering from pulmonary tuberculosis, in 54 other cases phrenicectomy was combined with pneumothorax (homolateral or heterolateral) and pneumolysis, or was performed after the pneumothorax had failed to improve the clinical condition. In all of these patients there was a considerable amelioration of the respiration and the cough, with a decrease or disappearance of the râles, the pulmonary cavities in many instances were collapsed. Only 4 per cent of the patients, who were under observation for from 1 to 7 years, died. Of the living patients, 60 per cent are very much improved and some of the women were married and have borne children.

J Tapie (Bull et mém Soc méd d hop de Paris 51 1636 (Dec 15) 1927), states that phrenicectomy frequently produces a quick and lasting improvement and makes it possible to judge the function of the other lung, if necessary, costal resection may be performed later with a greater sense of security. Sometimes, following the phrenicectomy, the improvement is so marked that no further intervention may be necessary. According to Tapie the favorable action of phrenicectomy on apical lesions cannot be entirely explained by the elevation of the diaphragm. The procedure also causes a retractile pulmonary sclerosis.

The change as brought about by phrenicectomy is summarized by E Mayer and H Leetch (J A M A 93 272 (July 27) 1929), as follows: (1) Compression from below upward, producing diminution of lung volume and corresponding partial immobilization, (2) lessened blood and lymph flow, (3) altered nerve supply due not only to excision of the phrenic nerve but also probably to removal or division of other important nerves or branches of the vagus or the sympathetic nerves. This last idea is supported by the observation in several individuals of a persistent tachycardia after phrenicectomy. These investigators offer as indications for phrenicectomy: (1) Unilateral, ulcerative or fibrocaseous pulmonary tuberculosis which is not acutely progressive, and which has a tendency to retraction and scarring, where pneumothorax is not practicable, (2) bilateral tuberculosis which does not admit of the risk of pneumothorax or thoraco-

plasty, in which extensive disease on one side can be active and on the other side stationary or slightly active. This is more particularly true when the lesion on the less involved side is being fed by an upper lobe cavity of the other lung, (3) as a test of the functional capacity of the other lung preceding thoracoplasty, (4) in return hemoptysis if either thoracoplasty or pneumothorax is indicated, (5) as an accessory measure in (a) aiding an incomplete pneumothorax or at the end of pneumothorax treatment when the lung does not re-expand, (b) in aiding thoracoplasty generally as a preliminary step, (c) as an adjunct to a partial upper thoracoplasty, (d) to aid in obliteration of tuberculous empyema cavities, with or without thoracoplasty, (e) in bronchiectasis or pulmonary gangrene.

Two types of operation exist: (1) Complete excision and (2) crushing of the phrenic nerve. With complete excision the diaphragm is permanently paralyzed, whereas in the crushing procedure, motion returns in from 3 to 8 months. This latter method has been advocated when an active, but not especially progressive, moderately advanced or far advanced tuberculosis in the other lung exists with active slightly progressive advanced disease on the operable side.

**THORACOPLASTY**—This therapeutic surgical procedure should be used in cases of pulmonary tuberculosis in which extensive involvement of a fibrotic nature is present, according to Ochsner (*loc cit*). It is primarily indicated in cases with unilateral processes. This writer advises the Sauerbruch technic, consisting of extrapleural paravertebral resection of the ribs. Sometimes even after an extrapleural collapse thoracoplasty, expectoration continues because of incomplete collapse of rigid cavities. The direct cause of the secretion is secondary infection.

B N Carter (J Med 9 431 (Nov) 1928) advises extrapleural thoracoplasty under local or nitrous oxide anesthesia, or both, and performs the operation by section of parts of the first to tenth or eleventh ribs inclusive from their articulations with the spine. The resection is done subperiosteally. In general, from about 12 to 15 cm of rib are removed from

the fourth to the tenth rib inclusive, from 6 to 8 cm from the second and third ribs, and 3 cm from the first rib. The first rib is always divided as the chest wall hangs upon it and complete collapse depends on the division of this first rib. Partial excision of the eleventh rib allows the diaphragm to rise and partially paralyzes it, effects of importance in lesions toward the base of the lung. Collapse of the chest places the lung at rest, collapses the walls of cavities, lessens the movement of the lymph flow and thereby preventing transmission of the disease into new parts of the lungs, and stimulates fibrous tissue formation in the compressed lung. Thoracoplasty of this type is indicated by the chronic fibrous types of pulmonary tuberculosis, with or without cavity formation, and for essentially unilateral pulmonary tuberculosis in a patient with good resistance in whom satisfactory artificial pneumothorax cannot be induced.

**MULTIPLE INTERCOSTAL NEURECTOMY**—J. Alexander (Am Rev Tuberc 20 637 (Nov.) 1929) has performed this operation preceded by phrenicectomy on 6 patients. The results have been unusually good in 3, negative in 1 and death in 1 was due to cardiocirculatory decompensation. Phrenicectomy should be performed from 1 to 3 weeks before intercostal neurectomy. Under local anesthesia a longitudinal incision is made to the angles of the rib and 2 or more centimeters of the second to eleventh intercostal nerves inclusive are resected at the distal angles distal to the posterior ramus. Alexander offers this operation as a substitute for thoracoplasty where the patients are too old or too weak for the latter operation.

**TUBERCULOSIS IN CHILDREN.—INCIDENCE**—The problem of finding and treating active tuberculosis among school children has been studied by E. L. Opie, H. R. M. Landis, F. M. McPhedran and H. W. Hetherington (Am Rev Tuberc 20 413 (Oct.) 1929). They found that the *tuberculin test* and the *roentgenologic examination* were the

most reliable methods of diagnosis. Among 4107 school children 37.7 per cent had positive tuberculin tests at 5 years of age and 90.2 per cent at 18 years. Evidence of pulmonary tuberculosis was demonstrated in 0.5 per cent by roentgenograms of the chest together with physical signs and symptoms. The high school children had active lesions more frequently than those in the elementary schools. Adolescent girls were affected twice as often as boys and the negro children 4 times as frequently as the white ones. Latent pulmonary tuberculosis was found in 1 per cent of the children and latent tracheo-bronchial foci were present in 10 per cent. Tracheo-bronchial glands were considered actively infected if a child was still in contact with open tuberculosis, if the tuberculin reaction was intense, if the glands were unusually large or, lastly, if the child had symptoms of impaired health.

The investigators were confronted with the problem of distinguishing those with active infections from those who had latent lesions or recent exposures to tuberculosis. The first group must be segregated and the others should have the benefits of open air schools, rest periods and added nourishment. For the selection of the group of patients needing prophylactic treatment, tuberculin tests and roentgenograms were necessary and it was advised that facilities for making these tests be made accessible to all school children.

Among 25,047 school children of North Carolina, 22.59 per cent gave positive reactions to the tuberculin test (P. P. McCain, South M. J. 22 310 (Apr.) 1929). Of the total number 1.79 per cent were diagnosed as

active tuberculosis. The negro children had a higher percentage of positive tuberculin tests and clinical tuberculosis than white children.

It is difficult to demonstrate tubercle bacilli in cases of tuberculosis in children but V Poulsen, K A Jensen and E Husted (*Am J Dis Child* 37 900 (May) 1929) have had considerable success in finding the micro-organism in the sediment of the material obtained by gastric lavage. They made direct smears of some of this, injected some into guinea-pigs and cultured the remainder on Petroff's medium. In 6 children who had symptoms and signs of tuberculosis and also positive tuberculin tests they found the bacillus in 4 on direct smear, in all 6 by culture and in 5 by guinea-pig inoculation.

In a second group of children who had no physical signs but who did have positive tuberculin tests and roentgenologic evidence of tuberculosis, they found the bacillus in 1 instance on direct smear, in 4 by growth on Petroff's medium and in all by guinea-pig inoculation. However, in a third group who had positive tuberculin tests but no physical or roentgenologic evidence of active tuberculous infection, the bacillus could not be discovered by any of the above methods.

Two hundred and fifty-four cases of tuberculosis in children under 12 years of age have been classified by C McNeil (*Brit M J* 2 655 (Oct 12) 1929) as follows: 174 were tuberculous meningitis, 195 abdominal tuberculosis with 93 fatalities, and 76 pulmonary tuberculosis of which 41 were fatal. These lesions often occurred together in the same patient. Under the age of 2 years, children

had but little resistance to tuberculosis and frequently died of their infection. As the age increased, recoveries were more frequent. The author claimed that latent tuberculosis in infancy was rare.

**ETIOLOGY AND PATHOLOGY.**—P R Withington (*New England J Med* 201 1034 (Nov 9) 1929) studied the relation of the milk supply of a community to the incidence of tuberculous infection. In 1 district he performed tuberculin tests on 100 infants and pre-school children, 47 of whom had been using unpasteurized and unboiled milk. The percentage of positive tuberculin reactions in this entire group was 7 times greater than among 100 children of the same age in a neighboring locality where the milk was pasteurized or boiled. The majority of the positive reactions in the former group was among the 47 who had been using raw milk.

E Rominger (*Ztschr f Tuberk* 50 113, 1928) has observed what he believed was the initial tuberculous infection in 2 children aged 6 years and 6½ years respectively. The first child who had been in good health and had had a negative tuberculin test developed a febrile illness after exposure to a patient with active tuberculosis. Four weeks after the onset of the illness, roentgenograms of the chest showed infiltration of lung tissue suggesting tuberculosis and 5 weeks after the onset of the illness, the tuberculin test became positive for the first time and remained so on succeeding tests. The second child had been exposed shortly before the onset of symptoms to a patient with active tuberculosis. Six weeks after this contact which had

lasted for 2 weeks, she developed symptoms of lassitude and lack of appetite, a slight fever and cough. A few vesicular, moist râles and slight alteration in breath sounds were heard in the left axilla and left interscapular areas. Roentgenograms revealed a soft shadow in the lung to the left of the vertebral column. Fifteen days later the tuberculin test became positive. Within 2½ months the child's symptoms of illness disappeared and the roentgenologic shadow in the chest grew smaller.

The site of the primary lung lesion of tuberculosis is a subject still debated. L. B. Dickey and L. H. Garland (Am Rev Tuberc 18:404 (Oct) 1928) reported a large number of pleural foci shown in roentgenograms of 327 tuberculous children. Among the 1 to 2 year old children 58 per cent had primary lesions probably due to tuberculosis, according to these investigators. W. S. Miller (Am Rev Tuberc 19:119 (Feb) 1929) discovered at necropsy a tuberculous lymph node in the pleura of a negro infant of 9 weeks of age. He was able to trace the lymph vessels in the direction of their flow and he could detect tuberculous infection only in those which conveyed the tubercle bacillus. The writer observed that the flow of lymph from the narrow zone at the outer border of the lungs is toward the pleura and through the pleural network to a hilus node while the flow from more central lymph nodes is directly toward the hilum.

A few infants with congenital tuberculosis have been studied by R. Grosser (Med Klinik 25:1467 (Sept 20) 1929). These new-born infants were separated from their mothers

immediately after the cord was cut and yet died of tuberculosis 26 to 68 days later. In 1 instance, tuberculous ulceration of the intestines was found at necropsy. Grosser classified the possible modes of congenital infection as first, placental, with the primary lesion in the infant being in the portal vein or lung, secondly, an intrapartum infection wherein the infant aspirates or ingests the bacillus in the amniotic fluid. In these instances the tuberculosis probably comes by way of the placenta and primary lesions may be found in the lung or the intestine.

The relation of monocytes to lymphocytes in 19 children with positive tuberculin tests was studied by P. M. Rogers (New England J Med 198:740 (May 24) 1928). A much higher ratio occurred in this group than in a similar group of tuberculin-negative children. Those who had active tuberculous lesions had a particularly high monocytic ratio.

K. D. Blackfan and L. K. Diamond (Am J Dis Child 37:233 (Feb) 1929) have reported similar results with the use of supravital stains. They have demonstrated an absolute increase in the number of monocytes as well as a higher monocyte-lymphocyte ratio in active tuberculosis and a fall when the infection subsides. They have employed this method as an indication of the state of activity of a tuberculous lesion.

**DIAGNOSIS**—J. A. Bigler (Am J Dis Child 38:1166 (Dec) 1929) compared *roentgenograms* of the chest taken during life with the pathologic changes found at post-mortem examination. He observed that a primary focus of tuberculosis apparently healed rapidly or spread more quickly

in children than in adults. Of 18 fatalities in which uncalcified primary lesions were discovered at necropsy, only 6 had had demonstrable roentgenologic shadows suggesting tuberculosis.

Changes in the hilum were considered to be types of secondary infection and consisted of hyperplastic lymph nodes either caseated or calcified, consolidation of surrounding lung tissue, pleuritis with adhesions to mediastinal structures or pressure atelectasis and fibrosis of adjacent lung tissue.

Miliary tuberculosis could be recognized by roentgenograms in about 50 per cent of patients. Bigler believed that with the roentgenogram, an accurate diagnosis of tuberculous bronchopneumonia and epituberculosis could be made. He was convinced that calcified areas in the lungs had been reported more frequently in roentgenograms than their actual presence at necropsy indicated. In a review of the literature, he found many records of negative tuberculin tests in patients who supposedly had calcified lung areas. He quoted the results of 1 investigator who found calcified areas in as little as 3 per cent of 171 necropsies of children under 5 years of age.

**PROGNOSIS**—B. M. Gasul (*Am J Dis Child* 37:909 (May) 1929) followed the course of 404 children who had had evidence of tuberculous infection sometime between the ages of 4 months and 2½ years. About ½ of them had positive tuberculin reactions only and the remainder had skin, gland, bone or lung lesions of tuberculous origin. The entire group was studied for 1 to 8 years and the

mortality was 371 per cent. Those infants who had the tuberculous infection before 6 months of age had a mortality of 172 per cent. Of those infected after 6 months of age 684 per cent died. There were no deaths among those who were infected after 1½ years. Gasul concluded that a poor prognosis need not be made when an infant is infected with tuberculosis early in life unless it is a definite miliary, meningeal or extensive pulmonary lesion.

**PROPHYLAXIS**.—A. Calmette (*Presse med* 36:33 (Jan 11) 1928) summarized the result of his method of vaccination against tuberculosis from the years 1924 to 1927. At the Pasteur Institute 52,722 infants have been given **B. C. G. vaccine** by mouth. In a group of 3808 babies exposed to tuberculosis who were vaccinated, a mortality from all causes of 31 per cent was reported as contrasted to a general mortality rate of 85 per cent among all infants in France. Of the number of deaths in the former group, only 0.9 per cent could be attributed to tuberculous infections while in infants exposed to tuberculosis but not vaccinated, the mortality was 24 to 70 per cent. Calmette investigated the status of 1941 children who had had contact with active tuberculosis and at the end of 4 years only 0.2 per cent had died of this disease as compared with 14 per cent mortality among unvaccinated infants who had or had not been in contact with tuberculosis. He claimed that no accidents or deaths from vaccination had yet occurred. He advised starting vaccination by the oral route before the infant was 15 days old. Three administrations 48



hours apart should be given. He believed that the lymph vessels and glands and the bone marrow became activated against tuberculosis and produced certain antibodies but without the development of definite tuberculous lesions. There has been considerable criticism of the method of analysis and the conclusions drawn by Calmette.

S. A. Petroff and A. Branch (*Am J Pub Health*, 8:843 (July) 1928) have isolated 2 strains of tubercle bacillus from samples of B. C. G. One was pathogenic to animals and the other harmless. They concluded that until the B. C. G. vaccine has been given a long, thorough trial to prove its value and harmlessness, its general administration to infants should be postponed. They called attention to the lowering of mortality from tuberculosis due to improvement in hygienic conditions and to the segregation of those with active lesions.

**TREATMENT**—Z. von Bokay (*Jahrb f Kinderh* 123:18 (Feb) 1929) has used deep x-ray therapy on 29 children with hilum tuberculosis. After an initial rise in fever, and an intensification of the tuberculous process, the general condition, appetite and color of the children improved. He recommended irradiation of the entire thorax with a 20 to 50 per cent erythema dose of 100,000 volts at a distance of 30 cm. with a 3 mm. aluminum filter. In the majority of patients, he found that 3 treatments at intervals of 4 weeks produced healing but he considered the method of treatment dangerous if there was any parenchymal tuberculous infiltration.

**TUBERCULOSIS OF THE SKIN.**—The resistance of the skin to tuberculosis infection was studied by O. Podwyssotzkaia and M. A. Linnikowa (*Ztschr f Tuberk* 52:474 (Jan) 1929) who report results of experiments on epilated guinea-pigs by rubbing into the skin either an emulsion of lupus nodules or tuberculous lymph glands. The authors conclude that the skin is unfavorable soil for the development of tubercle bacilli, but state that material of great virulence may break down the resistance and the skin thus becomes the portal of entry for tuberculous infections.

**TREATMENT**—S. Bommer (*Munchen med Wchnschr* 76:706 (Apr 26) 1929) advises a salt-free diet for the treatment of tuberculosis of the skin. Salt is eliminated in the preparation of food. Meat is either entirely omitted or considerably restricted. His daily ration consists of 90 Gm. (3 ounces) of protein, 162 Gm. (5½ ounces) of fat, and 222 Gm. (7½ ounces) of carbohydrates. Vitamins are supplied by liberal amounts of fresh fruit and vegetables. Necessary fat is supplied in the form of unsalted butter. Milk or milk gruels are given in large quantities. Treatment for lupus vulgaris is carried out in a sanatorium. Food is given at intervals 7 times daily and cod-liver oil twice daily. He claims tuberculous skin lesions will be cured by following this method of treatment.

A. Jesionek (*Munch med Wchnschr* 76:867 (May 24) 1929) recommends a salt-free diet in patients with tuberculosis. His article treats mainly of the chemical and biological action of the parenchymal cells of the skin, and of the substances that influence



their activity. He concludes that sodium ions and chlorine ions weaken certain chemical action of these cells, and that the reduction of the sodium chloride content, by means of a salt-free diet, enables the cells to counteract the tuberculous process. He regards this as the scientific explanation for a salt-free diet in tuberculosis.

A Strauss (Deut med Wchnschr 55 273 (Feb 15) 1929) states that copper is capable of checking the growth of the tubercle bacilli. He recommends the use of an ointment containing copper together with diathermy in the treatment of lupus vulgaris.

J Nicolas, J Lacassagne and J Rousset (Paris méd J 1 62 (Jan 19) 1929) report 17 cases of lupus erythematosus cured by the intramuscular injections of bismuth hydroxide. From 8 to 15 injections were required to effect a cure, only 3 recurrences were noted.

H C Saunders (New York State J Med 29 942 (Aug 1) 1929) reports 32 cases treated with gold and sodium thiosulphate, resulting in 15 cures, 4 of the cases were almost cured and 6 were improved.

#### TULAREMIA —INCIDENCE —

Tularemia, in man, is described by E C Hanson and R G Green (J A M A 92 1920 (June 8) 1929) as an acute infection characterized by the rapid onset of generalized symptoms and the coordinate development of a local ulcerative lesion at the site of a wound or insect bite. The disease is primarily a disease of rodents, in which it occurs as an epizootic disease. It is usually transmitted to man by wound contamination, from

contact with an infected rabbit, or by the bite of an infective deer-fly or wood tick. Of the 7 cases of the infection reported in this paper, 6 occurred closely grouped geographically in a region in which the disease had not previously been reported. They represent the first cases of insect transmission occurring in Minnesota and demonstrate a possible source of the infection not previously described.

The first infection of man, proved bacteriologically, was described by Wherry in 1914. In 1911, however, Pearse had described the clinical disease, under the name of "deer-fly fever," as occurring in Utah. It was Francis who showed in 1919, that deer-fly fever was an infection by *B. tularensis* and named the disease "tularemia." Francis and Ohara have identified Ohara's disease of Japan as identical with tularemia.

L L Merriman (Minnesota Med. 10 719 (Dec ) 1927) states that tularemia is primarily an acute infectious disease of rodents and wild rabbits and secondarily a disease of man—a new disease discovered by Americans. The onset is sudden, with severe headache, chills, fever, nausea, vomiting, general pains, sweating and prostration. He describes the 4 clinical forms.

**TYPES** —E Francis (J A M A 91 1155 (Oct 20) 1928) describes 4 clinical types based on 679 case reports.

1 The ulceroglandular type, manifested first by a papule of the skin followed by an ulcer and enlargement of the regional lymph glands.

2 The oculoglandular type, with conjunctivitis and enlargement of the glands.

3 The glandular type, with no

primary lesion at the site of infection, but with enlargement of the regional glands

4. The typhoid type, with no primary lesion or enlargement of glands

In all types there is fever characterized by an initial rise, a remission of 2 to 3 days, and a secondary rise. Leukocytosis is present to the extent of about 16,000. A skin eruption was noted in 32 cases and varied from a rash to a maculopapular eruption. Convalescence is slow, requiring about a month. In the 679 cases reviewed there were about 24 deaths. The fatal cases terminated in bronchopneumonia, lobar pneumonia, or meningitis. The existence of the disease can be proved by agglutination of the *B. tularensis* by the patient's serum or by isolation of the bacilli from the guinea-pig after inoculation of the animal with material from the primary lesion (William J. Pickett).

**ETIOLOGY**—Tularemia, as a disease of ground squirrels, was first described in 1911 and 1912 by McCoy and Chapin, who isolated the causative bacterium and named it *Bacterium tularensis*. The organism is a very small, short bacillus, showing bipolar staining, and is difficult to cultivate. It has recently been shown to be similar to the organism causing undulant fever and infectious abortion of cattle.

W. M. Simpson (Ann Int Med 1:1007 (June) 1928) presents an extremely comprehensive and thorough study of 49 cases of tularemia which appeared at Dayton, Ohio, within 4 months. No examples of the oculoglandular or typhoid types were encountered. In every instance the disease resulted from direct contact with the wild cottontail rabbit. An

interesting feature is the frequency with which laboratory workers with the cultures develop the disease. The same author (Ohio State M J 24:860 (Nov) 1928) reports 4 additional cases, bringing the total of Dayton cases to 53. He believes that tularemia is a common disease of man.

The infection was found by J. C. Perry (Pub Health Rep 43:260 (Feb 3) 1928) in 2 meadow mice sent in from rural California, which suggests that transmission among mice occurs through mites.

The seasonal incidence of tularemia and sources of infection are emphasized by the Public Health Service (U S Pub Health Rep 42:2948 (Dec 2) 1927). There are 3 sources of infection, viz., the tick bite, the fly bite and the dressing of wild rabbits. Tick bite cases occur from March to August. Cases of fly origin occur from June to September. Market men are often infected from dressing or handling carcasses of rabbits. One attack confers immunity.

H. D. Palmer and G. H. Hansmann (J A M A 91:236 (July 28) 1928) report a case of fulminating tularemia with necropsy, the patient having cut the dorsum of the third and fourth fingers of her left hand while dressing a rabbit and died of tularemia 11 days later.

Recent reports from the Union of Socialistic Soviet Republics (Editorial J A M A 93:696 (Aug 31) 1929) indicate that tularemia is probably world-wide in its distribution. S. Nikanorov has described three extensive outbreaks, involving more than 1000 persons, in 3 Russian provinces. The Russian cases of tularemia introduce a new animal host and transmitter of the disease—the

European water mole, or water rat (*Arvicola amphibius*)

Suvorov, Wolferz and Voronkova, attached to the Antiplague Laboratory of Astrakhan, have described 200 cases among human beings in that province Golov, Kniazevsky, Berdnikov and Tiflov have described 105 cases in several villages situated along the Ural River Four of the Russian investigators in Perm, U. S. S. R. have acquired the disease during the course of the experimental work. This brings the total number of laboratory infections to 24 Fifteen of the victims have been workers in the United States Public Health Service

**PATHOLOGY.**—Post-mortem examination in the most rapidly fatal case of tularemia in man on record (4 days and 7 hours) provided W. M. Simpson (Arch Path 6 553 (Oct) 1928) an opportunity to study the early gross and microscopic manifestations of the disease The characteristic “spotted spleen” and enlarged caseous regional lymph nodes were found The liver did not reveal gross evidence of focal necrosis He states that the lesions of tularemia should be classed with those of the infective granulomas It was demonstrated experimentally that the organism will penetrate the unbroken skin of guinea-pigs The oculoglandular form of the disease was produced experimentally in guinea-pigs

**DIAGNOSIS**—The disease may be confused clinically with pyogenic septicemia, lobar or bronchial pneumonia, miliary tuberculosis or typhoid Bacteriologically, it may be confused with malta fever and infections with *Brucella abortus* Pathologically, it is

very similar to tuberculosis. The authors report 7 cases of tularemia, and 2 cases of infections simulating this disease.

### TUNING FORK TESTS.—

In speaking of the rationale of tuning fork tests, R. Sonnenschein (Ann Otol, Rhin and Laryng. 37 309 (Mar.) 1928), in order to arrive at a definite diagnosis and indications for therapy, advises a carefully conducted examination He feels that the methods of examination and the manner of recording the findings should be more uniform and recapitulates as follows:

1 *Observation of the patient.* Loudness of voice (usually loud in severe inner ear disease, usually low in marked middle ear disease) Close attention and evident lip reading on part of patient, with often appearance of anxiety in effort to hear.

2 *Otoscopic examination* Inspection of (1) Auricle, (2) external auditory meatus, (3) tympanic membrane, (4) mucosa of tympanic cavity, if perforation of drum membrane is present, (5) mastoid region

3 *Nasal, nasopharyngeal and pharyngeal examination*

4 *Testing with speech* With patient's eyes closed or averted and opposite ear closed, use

(a) Unaccentuated conversation or whisper, employing high and low pitched numbers or words and combinations of high and low pitched sounds Designate in feet or meters or subdivisions thereof, the distances heard, or state if *ad concham*, or not at all. If the unaccentuated whisper is heard 1 or 2 meters, there is no need to use conversation.

5 *Inflation with Politzer bag or by catheter*, and again test hearing with speech (whisper or conversation)

6. *Tuning fork tests* Range of hearing Lower limits from C-2 (16 d v) upwards—*i e*, C-1, C, c, c-1, c-2, c-3, c-4, c-5 (4096 d v)

Upper limits

(a) Higher forks, c-4 (2048 d v) and c-5 (4096 d v)

(b) Galton whistle, preferably Edelman-Galton whistle or Schaefer-Galton

(c) Monochord

1 *Weber test* for lateralization Fork placed on median line of vertex, forehead or root of nose

(a) Normally heard in vertex ("in the head")

(b) Usually lateralized in worse hearing ear in conduction apparatus impairment If both ears have middle ear affection sound goes to worse of the two ears

(c) Usually lateralized in the better ear if disease of perception apparatus is present in other ear If both ears have perception impairment, sound usually lateralized in the better ear

2 *Schwabach test* for duration of bone conduction in the individual as compared with the normal, using living control, or comparing with average hearing for the particular fork employed Fork usually placed on median line of vertex or forehead, it may be set on mastoids Note whether bone conduction is normal, lengthened or shortened, a slight diminution being of no significance The age of the patient, the thickness of the hair or bones, the manner of application of the fork, firmness of contact of fork, etc., may give variation in length of bone conduction A definite lengthening of bone conduction means impairment

of conduction apparatus (adhesions, fixation of stapes, etc) A definite shortening of bone conduction means involvement of the perception mechanism (inner ear or auditory nerve) A decided change in bone conduction is in many ways the key to diagnosis and prognosis in ear disease

3 *Rinné test* for comparison of air with bone conduction in the same individual The stem of the fork is placed on the mastoid (avoiding contact with auricle), and when no longer heard the prongs are held close to without touching auricle or vibrissæ, and parallel with the ear, and the duration of hearing by air noted.

If a negative Rinné is suspected—*e g*, if the Schwabach was found lengthened, test air conduction first and then bone conduction

Normally the Rinné is positive (air conduction longer than bone) There are about 7 varieties of Rinné (2 forms of the positive, 3 varieties of the negative and 2 of the indefinite or plus-minus type)

4 *Gellé test*, for determining mobility of the footplate of the stapes Compressing the air in the external auditory meatus gives diminution of hearing in normal cases by pushing stapes into oval window, where fixation of stapedial footplate is present, no change in hearing occurs with increase in air pressure

5 *Stenger test*, for unmasking simulation of total unilateral deafness Two forks of exactly the same pitch are used, patient unaware that more than one fork is sounding The fork nearer one ear drowns out sound of fork at other ear

6 *Audiometers* are being used considerably in testing, and with them we get accurate measurements of

hearing in sensation units. Audiograms obtained give graphic idea of the state of hearing, which may be preserved for future reference and comparison. With properly calibrated forks, provided with the "constant" of damping or decrement, one is able to obtain a similar curve, but if many pitches are to be tested the process is somewhat more tedious than with the audiometer.

7 *Resonators* and other appliances should also be employed as previously mentioned in the methods of functional testing of hearing.

The same author (Ann Otol, Rhin and Laryng 38 805 (Sept) 1929) has stated that the prerequisites of good tuning forks are as follows:

1. They should be of one piece of metal.

2. The handle should be long enough to be easily handled without "damping" or stopping the vibrations.

3. The forks should sound a long time.

4. Weights should be placed on the lower pitched forks so as to avoid overtones.

5. Forks should not be nicked.

6. If rustless metal is feasible, it should be used to prevent changes by oxidation.

He recommends a fork made of an alloy consisting of 95.6 per cent magnesium, 0.4 per cent manganese and 4 per cent aluminum which can be made to conform to all of these qualifications.

**TYPHOID FEVER.—ETIOLOGY.**—It is generally agreed that the *Bacillus typhosus* is the offending organism, but a most interesting procedure is to trace the source of the infection even in small outbreaks and

epidemics. C. R. Hervey (Am J. Pub Health 19 166 (Feb) 1929) reports 13 cases of enteric fever, among a group of 20 surgical cases, to each of whom had been administered a rectal drip. After use, the containers were rinsed, but not sterilized, and gross pollution of the apparatus occurred. The first case developed typhoid 14 days following admission to the hospital and it was definitely believed that he was the source of infection.

As to longevity of the organisms, E. M. Wade and L. Shere (Am J. Pub Health 18 1480 (Dec) 1928), traced an epidemic to Cheddar cheese. Proven by knowledge of the date of manufacture of the cheese, the *Bacillus typhosus* lived in it for 63 days.

**DIAGNOSIS.**—M. A. Blankenhorn (Ohio State M J 25 626 (Aug) 1929) believes the correct diagnosis can be made by hospital internes in 87 per cent of cases within the first 3 days. This is done by observing that the patient complains of fever, headache, malaise or pain in the abdomen in 81 per cent of cases, together with a palpable spleen and abdominal signs in 65 per cent, fever in 100 per cent, slow pulse in 70 per cent, and the absence of leukocytosis in 91 per cent.

**COMPLICATIONS.**—The numerous complications of typhoid fever include hemorrhage, perforation, epididymitis, periostitis, osteomyelitis, lobar or bronchopneumonia, bronchitis, phlebitis, nephritis, myocarditis, and endocarditis, cholecystitis and biliary tract disease, and gangrene of the extremities.

**CARRIERS.—TREATMENT.**—One of the most serious problems is the

treatment of typhoid *carriers* Many attempts have been made to find some substance which, injected and secreted, will render the bile bactericidal R Kaewel and R. Kuhn (Arch f exper Path. u Pharmakol 125 242, 1927) have experimented on dogs with biliary fistulas and have used compounds of gold, silver, arsenic, mercury and others The most effective of all these substances was a complex compound of mercury named salicylallylamid-o-sodium acetate (*salyrgan*) It was used in 1 per cent solutions and could be recovered after intravenous injection in the bile, which it made bactericidal to *Bacillus typhosus* In the test-tube, it rendered infected bile sterile after 24 hours' incubation when the dilution of the substance was as high as 1 to 10,000 No apparent ill effects were noted

**TREATMENT**—H H Morris (China M J 42 369 (May) 1928) reports his experiences with the intravenous injection of a 1 per cent solution of mercurochrome in 14 cases The dose used was 23 cc (5 $\frac{3}{4}$  drams) per 100 pounds body weight The results were very good in 4 cases, good in 3, and negative in 6 cases The author stresses the value of early injections and states that in all the cases where a negative report was given, they were seen late, from the thirteenth to the twenty-fourth day

Prophylactic vaccination is, by far, the most important advance made in years in the study of typhoid fever At present experimental work is being attempted to determine the value of orally administered liquid and dry bacterins.

**TYPHUS FEVER.**—H Sparrow and U Lumbroso (Arch Inst Pasteur de Tunis 18 1 (Mar) 1929) inoculated guinea-pigs with typhus virus by depositing a drop of virulent or attenuated typhus virus into the nose or on the conjunctiva of the animals under experimentation Although the intranasal method of inoculation was always positive for the transmission of the disease, the results from instillation of the virus on the conjunctiva were not always so gratifying. The same dose of virus was used in the 2 methods of inoculation The better results obtained by the intranasal route are explained by the longer contact of the virus and a greater surface contact

Pathological evidence is presented by H A Reimann, G Y C Lu and C S Yang (Arch Path 7 640 (Apr) 1929) to prove that the blood platelets do not contain the virus of typhus fever or that the 2 factors are closely associated

B Coglievina (Wien k Wchnschr 42 900 (July 4) 1929) has demonstrated the fact that all patients with typhus fever have liver involvement An enlargement of the organ and a sensitivity to deep pressure in the right hypochondrium has been observed in a majority of the cases In 80 per cent of the cases, urobilinuria was noticeable and jaundice developed in 30 per cent Three patients had a severe icterus and died The author believes that the functional disturbances are mainly responsible for the psychic disturbances, the retarded coagulation, and the hemorrhagic tendencies He advises the use of methenamine and a colloidal silver preparation By a combination of

these 2 remedies, he believes the reticulo-endothelial system may be influenced

The heart is one of the organs most frequently affected in typhus, according to P Decourt (Paris med 1 357 (Apr 13) 1929) During the first 2 days he found the pulse to be strong, regular and about 90 in rate, on the third or fourth day, however, it tends to become soft and frequently dicrotic, and a dissociation between the pulse and temperature occurs By the sixth or the seventh day, the pulse rises to 110 to 130 About the twelfth day, when the temperature begins to fall, the pulse becomes soft and there are extrasystoles appearing Soon, there occurs a period of vascular instability and the strong regular pulse shows a fresh acceleration upon the slightest effort Typhus fever is usually associated with a lowered blood-pressure but as the temperature falls, the pressure rises The true cardiac complications resemble those of typhoid fever and consist in extrasystoles, tachycardia and collapse, giving rise to a sudden death

Decourt also reports (*ibid* 1 400 (Apr 27) 1929) the disturbances

which are manifest in the central nervous system Besides delirium, cephalalgia, and the symptoms of cerebral or spinal lesions of the pyramidal tract, many disturbances similar to those in epidemic encephalitis were observed These consisted of myoclonia, attacks of hic-cough, contracture of the extremities, tremor of the Parkinson or choreal type, nystagmus and diplopia Parasthesias, various types of cramps, and asthenia lasted for several months following the recovery from the fever

**TABARDILLO** — This form of typhus, known as the American or Mexican type, in contrast to the European form, is closely related to, but not identical with Rocky Mountain spotted fever, according to H. Mooser (J Infect Dis 44 186 (Mar) 1929) His reason for this belief is the injection of material into other animals The scrotal lesions which develop are believed pathognomonic of tabardillo in guinea-pigs This finding was not observed if the pig was injected in New York with the blood of patients suffering with mild typhus fever, Brill's disease

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**ULCERS, VARICOSE.** See VARICOSE ULCERS

**UNDULANT FEVER.—ETIOLOGY**—Undulant fever, states R A Kern (Am J M Sc 176 405 (Sept) 1928), may be caused by the *Micrococcus melitensis*, the organism of Malta fever, or the *Bacillus abortus*, the cause of infectious abortion in cattle He states Evans showed these 2 organisms to be so similar

that they could only be distinguished by special agglutinin absorption tests, and that they are really specific varieties of a common genus called *Brucella*

Numerous cases of undulant fever, due to goat's milk, have been reported, among them being those of R H Kampmeier (Am J M Sc 176 177 (Aug) 1928) The literature on the abortus type is rapidly

growing, and the transmission to man is usually from cattle or hogs.

Milk containing *Brucella abortus* has been found by C. M. Carpenter and R. Boak (Am J Pub Health 18:743 (June) 1928) in 608 per cent. of 378 cows examined. G. C. Bellinger and W. Levin (Northwest Med 28 9 (Jan) 1929) report an outbreak of undulant fever in a tubercular hospital and give as the cause the ingestion of raw milk or cream from infected cows. A similar outbreak has been cited by M. J. King and D. W. Caldwell (Am J. M. Sc 178 115 (July) 1929). Many cases occur from direct handling of infected cattle or swine, especially the aborted material, and A. V. Hardy (J A M A 93 891 (Sept 21) 1929) feels that direct entrance of the organisms through the skin is a more ready portal of entry than the digestive tract.

The geographic distribution of undulant fever is rather wide spread in the United States and especially in the cattle and goat raising regions. A. V. Hardy (J Iowa M Soc 19 483 (Nov) 1929) states that more than 300 cases have been recognized in the State of Iowa. It is more prevalent in regions where raw milk is used.

Males have been found to be much more likely to contract the disease than females, according to C. W. Wainwright (Bull Johns Hopkins Hosp 45 133 (Sept) 1929). Occupation is also very important, the cases of infection being particularly high among those handling goats and cattle, or meat packers.

**SYMPTOMS.**—The symptoms designated by Kern (*loc. cit*) are fever, malaise, weakness, tired feel-

ing, headache, muscle pains (generalized or in the back and extremities), chilliness, nocturnal sweats, vomiting, anorexia, epigastric pain, diarrhea and sore teeth. Occasionally, the initial symptoms are slight sore throat, cough, nervousness and insomnia. As the case progresses, the only characteristic symptom is fever, and the patient is not as sick as one might expect. There is no definite fever curve, and the fever may continue for months. Certain skin lesions have been reported as due to this infection. Physical examination is usually negative, except, possibly, an enlarged spleen and liver, with evidence of prolonged infection. A slight leukopenia is usually present.

**COMPLICATIONS** have been reported in undulant fever such as endocarditis, by R. W. Scott and O. Saphir (Am J M Sc 175 66 (Jan) 1928), intermittent hydrarthrosis, by B. M. Baker, Jr (Arch Int Med 44 128 (July) 1929), and spontaneous fractures, by J. Cuatrecasas and L. Garcia Tornel (Arch de med, cir y espec 28 669 (May 26) 1928).

**DIAGNOSIS.**—Two diagnostic procedures are essential, according to Kern (*loc. cit*) (1) Blood culture and (2) serum agglutination tests. A negative reaction must not be considered certain evidence against infection but complete agglutination in 1 to 40 is suspicious, while higher than 1 to 40 is good evidence of brucella infection, past or present. Others set 1 to 200 as the minimal convincing positive titer.

**TREATMENT.**—The treatment of undulant fever is still empirical, and symptomatic measures do not shorten its usual duration, which ranges



from 6 weeks to 18 months, according to A M Hoffman (J A M A 92 2169 (June 29) 1929) The administration of vaccines, colloidal metals, and mercurochrome has met with little success The author used acriflavine hydrochloride, 0.01 Gm ( $\frac{1}{10}$  grain) per kilo ( $2\frac{1}{2}$  pounds) of body weight, in 3 cases In each instance, the duration of the disease was considerably shortened.

A vaccine prepared from 5 pathogenic strains of bovine and 1 of swine *Brucella abortus* has been used by F. E. Angle (J Kansas M Soc 30.323 (Oct) 1929) in 10 cases with satisfactory results

**UREA.**—Hench and Aldrich (Semana med 35 167, 1928) determined that the urea in the saliva parallels that of the blood, so that it can be estimated in this fluid if for any reason it cannot be done on the blood

From the reports, there can be little doubt that urea can be used as a functional test of the kidneys The procedure must, however, be carried out in a standard way S E King (Arch Int Med 42 877 (Dec) 1928) gave 1 Gm (15 grains) of urea for each 10 pounds (5 kilos) of body weight and a characteristic curve was obtained Ordinarily, the blood urea level returned to its previous condition about 14 hours after ingestion Urea concentration test in the hands of M M Wintrobe (J Lab and Clin Med 14 848 (June) 1929) gave a more correct conception of kidney function than the phenolsulphonphthalein test in congestive cardiac failure There are dissenting opinions to this however

And now the use of urea as a diuretic is discussed by a number of

authors In dogs, B. V. Fuentes, J. Duomarco and A. Munilla (Rev. Asoc med. argent 41 869 (Sept.-Oct) 1928) obtained toxic symptoms by the intravenous injection of 1.5 to 5 Gm (23 to 75 grains) of urea per kilo ( $2\frac{1}{2}$  pounds) of body weight, and L Rohacek (Bratisl. lehár listy 7.598 (Dec) 1927) stated that, while urea is no longer considered a toxic substance, it nevertheless in certain circumstances produces symptoms, resembling uremia In several patients with the ascites of cirrhosis of the liver, he obtained excellent diuretic effects but had just as many failures D Simici, I Marcou and M. Popesco (Presse méd 36 946 (July 28) 1928) giving 25 to 50 Gm. ( $6\frac{1}{4}$  to  $12\frac{1}{2}$  drams) of urea daily for 3, 4 or 7 day periods separated by days of rest, during which the patient was given another diuretic, found the action of urea most energetic and constant. They recommend its trial in the treatment of transudates and exudates.

**UREMIA.—ETIOLOGY.**—Uremia may be due to 2 causes, according to M R Castex and N Romano (Rev Asoc med. argent 41 995 (Nov-Dec) 1928), retention and excess production, with inability of the kidneys to take care of this increased output Under this latter classification the following clinical entities may be enumerated

- 1 Great increase of nitrogen bodies in the blood without clinical uremia
- 2 Clinical uremia without increased nitrogen content in the blood
- 3 Increase of nitrogen bodies in the blood with a healthy kidney.
4. Nitrogen increase in the blood with arterial hypertension.

5 Nitrogen increase in the blood without arterial hypertension

As to the occurrence of uremia, it may be found with (1) Healthy kidneys, (2) in normal arterial tension or with hypertension, (3) in acute or chronic glomerulonephritis

*Experimental uremia* was produced in dogs by M H Streicher (Arch Int Med 42 835 (Dec ) 1928) by the intravenous injection of a 10 to 20 per cent solution of urea. It also caused a marked enteritis

*Post-operative uremia* could not be excluded in 9 post-operative deaths, according to van Houteghem (Zentralbl Chir 56 525 (Mar 2) 1929). A review of the reports of the urinalysis showed that in each case, irrespective of whether radium was used or not, the residual blood nitrogen increased in amount on the first or second day after operation, without any decrease in excreted urea, despite oliguria. The basal metabolism remained unaffected. Hence, the author is convinced that these were in reality cases of post-operative uremia. The amount of residual nitrogen was greater in the cases treated with radium than in the others, which is regarded as proof that in these cases the resorption of destroyed tissue has an etiologic significance

**SYMPTOMS**—An early symptom of uremic disease is given as rubescent vision by E Vinazzer (Med Klin 25 1395 (Sept 6) 1929). The 3 patients complained that at times everything became red before their eyes. All 3 developed uremia, and he concluded that rubescent vision is an early symptom of uremia. The condition is probably due to changes in the fundus oculi.

**COMPLICATIONS.**—Heart-block has been observed by H K Mohler (J. A. M. A 92 706 (Mar 2) 1929) to be associated with an increase in the non-protein nitrogen and uremia. The rhythm changing to normal with the return toward normal of the non-protein nitrogen

**DIAGNOSIS.**—Edema with anuria and death from uremia without nephritis is reported by O Klein and W. Nonnenbruch (Med Klin. 25 1583 (Oct 11) 1929) in a 42-year-old man who had contracted syphilis 4 years previously. He had been given injection treatments, but the Wassermann was still positive. No syphilitic symptoms could be detected. He developed generalized edema and late anuria, but did not show any disease of the heart or kidneys. There were no urinary changes and histologic examination of the kidneys failed to reveal symptoms characteristic for nephritis. Hypertension was not observed. The authors point out, that if acute, diffuse glomerular nephritis is considered a constitutional disease in which nephritis as a part symptom may be missing, then the case reported may be regarded as a dropsical form of this "acute diffuse glomerular nephritis"

**PROGNOSIS** — Polypeptides are significant in the prognosis of nephritis. A Puech and P Cristol (Ann de méd 25 43 (Jan ) 1929) have shown that polypeptides increase in direct relation to the severity of symptoms to as high as 0.300 in uremia. Because the azotemia never showed the regular increase or decrease in relation to the severity of the disease, they think polypeptidemia is of greater importance in the prognosis of nephritis than azotemia

**TREATMENT.**—Injections of hypertonic solution of Glauber's salt used by Castex, Romono and Rey (Rev Soc de med int, (Oct-Nov) 1928) in the treatment of uremia brought about a general improvement in the condition of the patient. The urea content in the blood was reduced from 1.40 grains to the normal limit of 0.38 ml. The arterial tension which had gone up during the uremia was also appreciably reduced.

**URETER.—ANOMALIES, CONGENITAL**—A case of supernumerary ureter, in a girl 6 years old, is reported by V. Gaudiani (Arch ital di chir 18:468, 1927). This originated in an accessory pelvis of the left kidney and its external orifice was in a small paraurethral caruncle. Another case, in a 16-year old girl is reported by Hyman (Ann Surg 89:616, 1929). Operation was successful. The ectopic ureter was cut across far down in the pelvis and the stump carbolized.

A rare anomaly of the ureter is reported by F. R. Hanlon (J Urol 21:123 (Jan) 1929). The left kidney possessed 2 pelves. The ureters were completely duplicated and terminated with separate orifices in the bladder. The right kidney was normal in size and had 1 pelvis and 1 ureter. When the bladder was opened, 2 ureteral orifices were noted on the right side. On probing the accessory orifice it was found to end blindly 3.8 cm above the point of origin.

**CALCULI.—DIAGNOSIS**—The diagnosis of ureteral calculi is discussed by A. Fullerton (Brit M J 2:327 (Aug 25) 1928), who states, after discussing symptoms in detail, that

x-rays are one of the most valuable aids in diagnosis.

**TREATMENT**—In a review of 1550 major surgical operations on the kidney and ureter, V. C. Hunt (Northwest Med 27:213 (May) 1928) states that approximately 75 per cent of stones in the lower ureter have been removed or induced to pass by catheter manipulation. Multiple and large stones and small impacted stones contraindicate this procedure. Seventy per cent of the ureteral stones requiring surgical removal are situated in the lower third of the ureter. Exposure of the lower half of the ureter is affected most readily by low median incision. Because of the mobility of many of the ureteral stones exact localization should immediately precede operation.

**CARCINOMA**—A case of primary carcinoma of the ureter, the 39th on record in the literature is reported by L. P. Player (Urol and Cutan Rev 32:438 (July) 1928). Metastatic carcinoma in the ureter from the prostate, by way of the lymphatics, is reported in 2 autopsy findings by W. J. Carson (Ann Surg 86:549 (Oct) 1927), only a few cases having been recorded in the literature. Another case of scirrhous carcinoma of the ureter, as a result of late metastasis from carcinoma of the breast, is reported by N. P. Rathbun (J Urol 21:507 (Apr) 1929).

**DIAGNOSTIC MEASURES**—The use of a dilating catheter in ureterography, as an aid in diagnosis, is advised by H. A. R. Kreutzman (J Urol 21:471 (Apr) 1929). The author believes that as new evidence is obtained by this type of investigation, it will be necessary to form a

new clinical conception of the normal ureter, entirely different from the description now given by anatomists.

**OBSTRUCTION.**—That ureteral obstruction may be the cause of vague abdominal pain which may lead to mistaken diagnoses, countenancing a laparotomy, is the thought of A J Sparks (*J Indiana M A* 21 376 (Sept) 1928). The author describes 3 cases. This opinion is likewise substantiated by H M Ginsberg (*M. J and Rec* 128:211 (Sept 5) 1928), who recommends a cystoscopic examination in all cases of obscure abdominal pain in women.

That congenital ureteral obstruction is not uncommon in children is expressed by M F Campbell (*Am J Surg* 5 445 (Nov) 1928). The author feels that when obstruction is recognized early, the patient may be spared irreparable renal destruction and years of suffering, and perhaps an early death. The same author, in conjunction with J D Lytle (*J A M A* 92 544 (Feb 16) 1929), report 74 cases of obstruction in infancy. They advise urologic examination and cystoscopic study in every case of pyuria lasting over a period from 4 to 6 weeks. Young children are more tolerant to such examinations than adults.

**OPERATIONS.**—That transplantation of the ureters into the large bowel is justifiable in any condition in which the bladder is hopelessly diseased or completely useless as a reservoir, is the opinion of R C Coffey (*Northwest Med* 27 303 (June) 1928). The same author, in a detailed and well illustrated article (*Surg Gynec Obst* 47 593 (Nov) 1928), says that now, for the first time, he feels justified in recommend-

ing the operation for general use by the skilled surgeon.

A case of ligation of both ureters, which occurred accidentally in ligating the uterine arteries, is reported by M Papin (*Bull et mém Soc. nat. de chir* 54 1026 (July) 1928). After 51 hours, a laparotomy was done and the condition discovered. The patient made a subsequent recovery. Urine entered the bladder within a few hours after removal of the obstruction.

End-to-end anastomosis of the ureter, after accidental section, is discussed by I Iriarte and C Olivera (*Semana med* 2 397 (Aug 16) 1928). These authors stress the point that suture alone is not sufficient, but that it must always be reinforced. The peritoneal cuff acts as a transplant.

**STRICTURE.**—In a detailed discussion upon ureteral stricture, its anatomical and pathological background, based upon the findings in 100 consecutive autopsies, M Schreiber (*Surg Gynec Obst* 45 423 (Oct) 1927) reaches the following conclusions:

1 Stricture of the ureter is a definite pathological entity.

2 The discovery of ureteral stricture or stenosis in 12 per cent of the autopsies corroborates the great number of ureteral strictures or stenoses reported clinically.

3 Of the autopsies, 10 per cent showed latent symptomless hydro-ureteronephrosis. The condition is, therefore, of relatively frequent occurrence.

4 Ureteral stricture as a localized intrinsic inflammatory process in the ureteral wall, metastatic in character, and due to focal infection, apparently does not occur, or is extremely rare, as compared with ureteral strictures or stenosis of other origin.

5. The condition is found most fre-

quently in the pelvic ureter, in a zone from 2 to 6 cm up from the ureteral orifice

6 Etiologic factors in the pathogenesis are in the order named (a) congenitally accentuated narrowing of a physiologically narrow site, (b) extension of inflammatory processes into the ureteral wall from adnexal disease, with or without thrombophlebitis, and advanced chronic cystitis; (c) occluding, kinking power of crossed anatomical structures, such as the vas deferens in the male and the uterine artery in the female

7 Caution is necessary in the interpretation of the physical signs obtained by the wax-bulb hang method of Hunner, especially in the very important region from 2 to 6 cm up from the ureteral orifice, since in this region are found numerous physiological sites of narrowing and increased density of the ureteral wall

In a preliminary report on an experimental study of ureteral strictures produced upon dogs, V Vermooten, W H van Hart and E P J Kearney (J Urol 19 341 (Apr) 1928) conclude that strictures can be produced artificially without difficulty, and that the changes occur uniformly and progressively, although comparatively slowly

In a clinical study of benign ureterospasm, ureteral stricture and allied syndromes, L D Keyser (J. Urol 19 355 (Apr) 1928), thinks that the conditions of spastic ureter, ureteral stricture and allied conditions of nephralgia, ureteral neurosis, etc, represent a neuromotor dysfunction such as is seen in the esophagus and other smooth muscle structures. Dilatation gives relief, but is an ordeal for the hypersensitive patient and is frequently followed by recurrence. Nephrectomy should be reserved for patients who fail to respond to more conservative methods

**DIAGNOSIS.**—That the methods now in common use for diagnosis of the condition are not entirely reliable is admitted by O S Fowler (J. Urol. 21 465 (Apr) 1929), who suggests that an ideal method of ureteral investigation would be x-ray examination, following the administration of a substance opaque to the x-ray, which would be excreted by the kidney. By such a method it would be possible to determine the presence and site of an obstruction to the flow of urine without the instrumental irritation. From a roentgenological view, W F Braasch (Radiology 12: 183 (Mar) 1929) calls attention to the fact that an unqualified diagnosis may be impossible, because of the factors of distention and overdistention, together with return flow alongside of the catheter, all of which may give the impression of dilatation. The same author (J A M A. 91: 1263 (Oct 27) 1928) deplors repeated and long continued dilatations of the ureter, particularly when the urogram does not show evidence of abnormality

In a review of 8 cases, J T Watkins and R E Cumming (Ann. Int. Med 1 707 (Mar) 1928) express the opinion that ureteral stricture is a definite clinical entity and is often confused with appendicitis and gall-bladder disease. They, therefore, suggest a kidney-ureter-bladder tract investigation before surgical procedures are instituted

In a report of 9 cases of ureteral stricture in women, L M Miles (Minnesota Med 11 390 (June) 1928) believes that the condition presents a fairly definite syndrome with rather definite physical findings, but it can be diagnosed positively only

by cystoscopy and ureteral exploration with bulbed catheters and the aid of the x-rays. That it is incumbent on the gynecologist to make a meticulous survey of the urinary tract when a patient, despite one or more pelvic operations, still complains of her original symptoms, is the expression of G L Hunner (Am J Obst and Gynec 15 453 (Apr) 1928)

**TREATMENT**—The use of a *laminaria tent* mounted on a ureteral catheter to dilate the lower ureter, is reported by M Chevassu and P Lazard (J d'urol 26 543 (Dec) 1928) The authors report good results The tent must be introduced rapidly, before it has time to lose its rigidity.

**URETHRA.—CALCULI — DIAGNOSIS**—A large urethral calculus, 4 years *in situ* and undiagnosed until operation, is reported by Marchini (Arch ital di urol (Feb) 1928) The mass was first diagnosed as syphilis because of a positive Wassermann, but when antiluetic treatment did not help, a fibroma or fibromyoma was suspected Another report of a stone weighing 163 grains, lying in the long axis of the bulbous urethra and giving the patient no consciousness of its presence, is reported by H R B Hull and R J G Parnell (Lancet 2 1023 (Nov 17) 1928) It was found while Cowper's glands were being palpated

An impacted calculus in the female urethra, diagnosed preoperatively, is reported by T S Klots (Nederl Tijdschr v Geneesk 2 4217 (Sept 1) 1928) A sound passed into the urethra encountered a stone just below the neck of the bladder. The

calculus was then removed by a **forceps** for extracting foreign bodies from the nose, complete recovery following within a week

**CARCINOMA.**—Two cases of carcinoma of the male urethra are reported by E M Watson (J Urol 21 217 (Feb) 1929) Diagnosis cannot be made early, since symptoms cannot well be differentiated from those of the earlier lesions namely, stricture, infection and papilloma The condition is rare and treatment is unsatisfactory

**DIVERTICULA. — TREATMENT**—Congenital urethral diverticulum is quite rare, according to B B Nicholson (J Urol 18 145 (Aug) 1927) Treatment of any diverticulum should be directed toward removing the sac and clearing up the infection The most evident sign is a tumor appearing upon voiding and afterward collapsing spontaneously or under external pressure

Ten cases of diverticula are reported by R W McKay and J A C Colston (Surg Gynec Obst 48 51 (Jan) 1929) Two types of operation were used In 1 type the diverticulum was freed and resected close to its entrance into the urethra A purse string suture brought the stump into the urethra Drainage of the bladder was obtained by means of a retention catheter, but the operative area was not drained In the other type of operation, the cavity of the diverticulum and the prostatic urethra were converted into 1 cavity This procedure is applicable only to diverticula in the posterior or prostatic urethra

**RUPTURE**—Six cases of complete traumatic rupture of the male urethra are reported by W. I de C Wheeler (Proc Roy Soc Med.

(Sect Urol) 22 31 (Feb) 1929) Operation should be done in all cases, whether an instrument can be passed or not. As a rule, **suprapubic cystotomy** and **retrograde catheterization** are done, the urethra being sutured over the indwelling catheter. After a year the passage of instruments is unnecessary if the patient is symptomatically well.

A case of rupture of the male urethra in association with fracture of the pelvis, resulting in impotence, is reported by A C Abbott (Canad M A J 20 634 (June) 1929). The author believes that impotence in this case was due to the tearing away of the greater and lesser cavernous nerves, so intimately related with the wall of the urethra above the triangular ligament. When the patient's prostate and bladder were violently torn away from the back of the symphysis, these fibers were also torn. Repair, either by surgical or Nature's means, was quite impossible.

In a review of the literature, H Bailey (Brit J Surg 15 370 (Jan) 1928) describes various operations for the correction of rupture of the urethra and emphasizes the inadvisability of the use of the retention catheter and the advisability of **suprapubic cystostomy**.

H H Young (J Urol 21 417 (Apr) 1929) reports 9 cases of fracture of the pelvis complicated by rupture of the urethra. He calls attention to the fact that all cases of fracture of the pelvis should have a complete careful examination of the urinary tract, since 1 case died due to delay in operation, and in several others serious complications occurred.

**STRICTURE.—DIAGNOSIS.—**Urethrography is recommended as a

superior method of diagnosis of stricture, fistulae, false passages, foreign bodies and diverticula by F Partsch and Breitlander (Ztschr f urol Chir. 25 108, 1928). The authors use *iodipin* or *barium sulphate* mixture.

**TREATMENT**—In discussing the treatment of urethral stricture and fistulas by **excision**, Frank Kidd (Proc Roy Soc Med (Sect Urol) 21 33 (July) 1928) asserts that for hard tunnel strictures and in cases of perineal fistulas, we should be bolder about adopting the principle of excision rather than that of mere external urethrotomy. The author describes in detail, with illustrations, the technic of Russell and MacGowan. A **preliminary suprapubic cystotomy** is advised and also the avoidance, as far as possible, of the indwelling catheter. All fistulas should be excised completely, not merely opened, scraped and drained, taking care at the same time not to cut the compressor urethra muscle. The operator should not be in too great a hurry to pass sounds of too large a caliber after the operation, since in many cases there is little tendency to reformation of the stricture. In his cases of stricture, the author gives a grain (0.005 Gm) of **thyroid extract** by mouth every night for many weeks at a time. He believes that the fibrous tissue of a stricture is softened by this measure and is rendered more amenable to dilatation.

M F Campbell (Ann Surg 89 379 (Mar) 1929), reviews 1244 cases of stricture of the male urethra which were treated on the urologic service of the Bellevue Hospital, New York City, from April, 1910, to Jan., 1928. The operative mortality of 848 cases

treated surgically was 4.9 per cent, exclusive of the cases of urinary extravasation. The author believes that it is imperative to keep up dilatation of the urethra after urethrotomy, because one-third of the cases will require reoperation and two-thirds of the latter will require reoperation within 10 years

**Temporary hypogastric cystostomy** in the treatment of complicated strictures of the urethra is recommended by P Flandrin (Paris méd 2 335 (Oct 20) 1928). The author states it is a harmless operation and one that is easy to perform. It is also accompanied by fewer risks than are the useless or impossible urethral manipulations, which may upset a precarious equilibrium and stir up a latent infection that may become very severe and even endanger the patient's life

Stricture of the female urethra is reviewed by A E Anderson (Northwest Med 27 520 (Nov) 1928) who believes that elimination of the causative factor is necessary. The 3 cardinal symptoms are frequency, urgency and dysuria. **Dilatation**, supplemented by local treatment, is the only measure giving relief

**SURGICAL RESTORATION** — The formation of a urethra from the bladder, following its complete destruction, in a woman, is reported by N Markoff (Gynec et Obst 18 6 (July) 1928), who describes the technic of his operation in detail. S H Harris (J Coll Surgeons, Australia 1 390 (Mar) 1929) reports 3 cases of restoration of the female urethra, in which he did a modification of an old operation for penile hypospadias. The operation provides for a good body of tissue be-

tween the new urethral tube and the surface, and all sutures are easily tied without tension. Healing by first intention was the rule.

### URINARY ANTISEPTICS.—

In a discussion on this subject by Browne, Dukes, Hammill, Jeans and others (Proc Roy Soc Med 22 1127, 1929), mercurochrome, by the intravenous route, in a 1 per cent solution, should not be used except in cases of extreme emergencies, or in acute sepsis, only after other measures have failed. Orally, hexamine is considered by the authors very effective, it, of course, being active only in an acid medium and should therefore be given in combination with acid sodium phosphate. Hexyl-resorcinol, while very effective in reducing the number of organisms and relieving symptoms, does not, however, seem to be especially effective in eradicating infection. Salicylic acid, boric acid and salol are considered weak and ineffective. Acriflavine in keratin-coated capsules is more bactericidal in alkaline, than acid, urine. Copaiba and sandalwood oil diminish symptoms and organisms in gonococcal cystitis

**UROBILINURIA.**—M H Edelman (New York State J Med 29 453 (Apr 15) 1929) observed an increase in the daily output of urobilin in children with cardiac decompensation, probably as a result of liver stasis and dysfunction. Since the amount of urobilin increased with the degree of decompensation, this substance may be used as an additional guide to progress of the heart

**UROGRAPHY, INTRAVENOUS.**—A diagnostic procedure which promises to be invaluable in studying lesions of the kidneys, kidney pelves and ureters, has recently been developed. Osborne, Sutherland, Scholl and Rowntree, (quoted by M Swick Am J Surg 8 405 (Feb) 1930), in 1923, were the first to attempt the visualization of the urinary tract, using intravenous injection of *sodium iodide*, 10 per cent solution. The first prac-



tical results of the methods, however, were achieved by Reseno, using *sodium iodide* and *urea* in chemical combination in such a way that the iodine content is comparatively non-toxic. The work was then begun with *selectan neutral*, a drug synthesized by Binz and Rath and used in Hamburg. Experimental work on rabbits showed that the kidney tissues and urinary tract could be visualized after intravenous administration of selectan neutral. The pelvis and ureter, however, were poorly seen. Approximately 80 per cent of the injected iodine was recovered in the urine. Due to incomplete visualization of the entire urinary tract, a modification of the drug was in order. The investigators diminished its toxicity by substituting a methyl group, in order to permit of the administration of a larger dose, thereby attaining a higher concentration of iodine in the renal tract—an important factor for x-ray success.

Oral administration of various modifications of the drug were tried but proved to be unsatisfactory, because of the poor absorptive powers of the gastro-intestinal tract.

*Uroselectan* was finally made. This is a comparatively non-toxic drug, which is easily soluble in water, neutral in reaction and is normally excreted as such through the renal tract, 10 to 100 per cent being recoverable within 8 hours, thus showing that no chemical changes of the uroselectan take place within the body tissues. The iodine in the molecule is supposed to be organically bound and is neither inorganic or ionized. This may explain why iodism has not been observed. Tolerance for uroselectan, as proven by experimental work on mice and rabbits, is exceedingly great.

W. W. Galbraith and W. A. Mackey (Brit. J. Urol. 2:122 (June) 1930) quote Binz and Rath concerning the chemical formula of uroselectan, 2-oxy-5-iodopyridine-N-acetic acid-sodium, which contains 42 per cent of iodine by weight and possesses a high degree of radio-opacity. Galbraith and Mackey utilized this drug in studying the urinary tract of rabbits, even in the presence of renal damage it was noted that the elimination of uroselectan did not cause any exacerbation of the lesion and while albuminuria was noted

originally, it did not become more pronounced during or following the excretion of the drug. Histological examination of the kidneys showed no damage to the glomeruli or tubular epithelium. Galbraith and Mackey conclude that uroselectan is practically harmless and unlikely to cause renal damage.

Swick (*loc cit*) points out that quantitative determinations of uroselectan eliminated through the kidneys can form the basis for a renal functional test. He calls attention to the fact that a normally functioning kidney possesses the power to excrete this substance with a thrust, that is, a relatively large amount of the drug within a given short period of time, which period is designated as the normal thrust excretion. Approximately, 60 per cent of the dye is thrown off through the kidneys during the first 2 hours, about 25 per cent during the next 2 hours, and the last 15 per cent during the following 4 hours. Proper clear visualization of the renal tract depends upon the excretion of a fairly large amount of the dye within a short time, i.e., visualization or non-visualization of the genito-urinary tract depends upon functional activity of the kidneys.

**ADMINISTRATION OF UROSELECTAN**—From 30 to 40 Gm (1 to 1½ ounces) of uroselectan are dissolved in doubly distilled water to a volume of 100 c.c. (3¼ ounces). This is the normal dosage for adults. The solution is then twice filtered through ordinary filter paper, sterilized in a water bath or autoclave at 15 pounds of pressure for ½ hour. For a child of 7 years, one-half of the dose is given, and a child of 2 years received but one-quarter of the dose given an adult.

The solution is given with a syringe, rather than by gravity, in order to avoid any foreign body reaction from the rubber tubing. Five to 6 syringes with needles are sterilized in distilled water and filled with the solution. The injection is done in 2 stages at intervals of 3 to 5 minutes.

Under normal conditions, the first x-ray plate should be made about 15 minutes after the last intravenous injection, the second plate 20 to 30 minutes after the first plate, and the third plate about a half hour after the second. The number of plates to be further made and the time at

which they should be made, depend upon the functional activity and derangement of the kidney substance. With poor renal function it is well to take further plates at 2 to 4 hour intervals, and to judge the time according to the intensity of the shadow present.

**REACTIONS**—During the injection, patients frequently notice a transient thirst and generalized warmth, especially of the face and urinary bladder. Swick (*loc cit*) found nausea present in but 2 patients in his series. Shivering and vomiting were reported in a case of nephrosis by Lichtenberg.

**INDICATIONS**—Swick (*loc cit*) states that the indications for the use of uroselectan intravenously become evident whenever ureteral catheterization is dangerous or impossible, where mechanical or infectious factors of the lower genito-urinary tract rule out cystoscopy. Wherever bleeding from the tract occurs, in cases of implanted ureters, in children, or where instrumentation is definitely harmful, the intravenous use of uroselectan is obvious. Where renal function is poor intravenous urography will, of course, be correspondingly deficient. Utilizing intravenous urography, surgical lesions of the genito-urinary tract can be identified at a much earlier date than is at present the rule.

In a discussion of Swick's excellent paper, Beer called attention to Lichtenberg's conclusions with reference to the use of uroselectan. They are as follows: (1) Absence of a kidney shadow means (a) no kidney or (b) almost functionless kidneys, (2) absence may also be evident in the presence of extensive tumors, pyonephroses and badly infected obstructed kidneys, (3) in advanced cardiac disease with insufficiency there will be absence or deficiency of the shadow, (4) in peripheral obstruction with infection no shadow may occur.

**CLINICAL STUDIES**—R. J. Willan (Practitioner 125:296 (Aug.) 1930) reviewed his experiment in studying 14 cases by intravenous urography. In 12 of these cases control ureter catheterization was done, 8 patients were male and 6 females. The clinical diagnosis was as follows:

Urinary tuberculosis	7
Urinary calculus	3
Ectopic kidney with calculus	1
Torsion of the kidney	1
Essential hematuria	1
Chronic urinary sepsis	1

The best results were obtained by Willan with the radiogram taken 45 minutes after administration of the uroselectan. In 7 of his cases, the dye was definitely constructive and helpful in arriving at a diagnosis, in 5 there were shadows, but too indefinite to prove of any value, while in the other 2, nothing whatever was seen. In 3 cases showing (1) Torsion of the kidney, (2) ectopic calculus pyonephrosis and (3) tuberculosis, the affected kidney did not appear to function. In 2 of these, ureter catheterization failed.

Obstruction to the onward flow of the urine, particularly ureter obstruction, would seem essential for the production of a good pyelogram by this method. Willan states that this is not necessary, as proven by 2 of his cases in which no hindrance to the passage of a large ureter catheter occurred.

Willan doubts the advisability or possible success of intravenous pyelography in young children, because of the difficulty in finding a superficial vein of adequate size, and also due to the children's natural dislike to a needle puncture.

He points out that the most frequent cause of failure is delayed excretion of the drug from poor renal function. He advises that better pyelograms by this method will be obtained if the recumbent patient is maintained in a semi-vertical position, with the pelvis and lower extremities raised. Gaseous distention of the large bowel is troublesome.

This author states that, in his opinion, intravenous pyelography will never equal ureter catheterization, since it will be unusual to obtain uniformly sufficient intrapelvic pressure to outline the earlier stages of abnormality in diseased minor calyces, as found in early tuberculosis, early malignancy and in chronic pyelonephritis. On the other hand, he states its use may be of definite value in certain cases where it is quite impossible to catheterize the ureters, such as urethral stricture, enlarged prostate gland, a urinary bladder incapable of

distention, renal malformations, certain renal hemorrhages and ureter obstructions, urinary bladder fistulas, and also ureter transplantation into the rectum

H L Kretschmer (Surg Gynec Obst 51 404 (Sept) 1930) cites his experiences in studying a series of 85 cases of both sexes, in children as well as in adults. He states that in the entire series there were no local reactions, no local pain except in 2 cases, no systemic reactions, such as chills and fever. In a series of 10 cases, in infants and children, tolerance for uroselectan was especially good. In 4 of these cases excellent urograms were obtained. Congenital anomalies were easily demonstrated, showing bifid pelvis and a horseshoe kidney. In a case of polycystic renal disease, the intravenous pyelograms were readable but unclear.

Kretschmer states that the best pyelograms and ureterograms in routine work were in cases of hydronephroses and hydro-ureters. In the presence of renal and ureteral calculi, the intensity of the shadow was sometimes increased by uroselectan with stone in the ureter, and the drug readily showed whether the stone caused a complete or an incomplete obstruction. A diagnostic point of great value in determining whether the patient should be operated at once or, because the urine passes by the stone, delay is justifiable, since the stone might pass out unaided or by the use of cystoscopic manipulations. In these calculi cases, the renal shadow on the affected side was found by Kretschmer to be much more clearly outlined than on the normal side.

Because of rapid elimination of the uroselectan and its collection in the urinary bladder, he advises drainage of the bladder with a catheter in cases in which the study is directed toward the lower end of the ureter. The sudden disappearance of dilatation of the ureter following the passage of stones and also following dilatation of strictures can be readily shown.

With malignant tumors of the kidney, filling defects have been shown and the diagnosis was facilitated. If advanced destruction of kidney tissue from the tumor growth has occurred, the intravenous pyelograms are not so clearly defined as in those made from below.

Kretschmer has used uroselectan as a medium for making pyelograms by ureter catheterization diluting the standard solution with equal parts of water. The advantages are that the pictures are beautifully clear cut, the drug is non-irritating, and no reactions result from its use.

A Hyman (*ibid* 51 409 (Aug) 1930) has used uroselectan in the diagnosis of urological diseases in childhood, studying 22 patients who were controlled by cystoscopy, and has obtained similar results.

### URTICARIA.—ETIOLOGY.—

L Pasteur Vallery-Radot, P Blamoutier, J Stehelin and J Saidman (Bull et mem Soc med d hôp de Paris 52 1122 (July 5) 1928) report a case of solar urticaria occurring in a woman of 43 years who had been afflicted for 20 years. Exposed portions of the body were the sites of predilection. It never affected regions of the body other than those left uncovered by the clothes, such as face, hands and neck. The rays of the solar spectrum occurring between violet and red were regarded as the provocative ones.

E Lehner (Klin Wchnschr 8 306 (Feb 12) 1929) reports a case of urticaria in a man, aged 23, who had been bathing in cold water. If his skin was touched with ice or ice water urticarial wheals resulted. A piece of ice taken into the mouth caused wheals on the palate and tongue.

J N Roussel (South M J 22 668 (July) 1929) states that the real reason one develops urticaria is not that one has eaten some shell-fish, but because something more fundamental has gone definitely wrong. The shell-fish is incidental, probably acting as a catalytic agent, initiating and changing the velocity and force of the vasomotor impulses. He be-

lieves the endocrine glands are at fault and his treatments consist of endocrine therapy.

**TREATMENT.**—O Burwinkel (*Deutsche med Wchnschr* 54 706 (Apr. 27) 1928) found a salt-poor vegetarian diet in combination with large doses of sodium bicarbonate effective in treating chronic urticaria.

A Arguelles Terán (*Arch españ de pediat* 12:303 (May) 1928) obtained good results in urticaria with the use of splenic extract. The extract (tablespoonful in water previously acidulated with hydrochloric acid) is given 3 times daily before meals.

Lichtmann (*Wiener med Wchnschr.* 78 1078, 1928), reports the successful treatment of both acute and subacute forms of urticaria with pituitary extract.

B M. Kesten (*Arch Dermat and Syph.* 16 189 (Aug) 1927) found ephedrin very efficient in the treatment of urticaria and asthma. No harmful effects from its use are recorded, and cures have been consistently reported.

**UTERUS, CANCER OF.**—It is generally conceded that cancer of the uterus is the most frequent clinical form of malignant disease arising in women. As a lethal malady it stands in the foremost rank. One out of every five deaths among women between the ages of 45 and 65 is due to cancer, and the uterus is the organ affected in almost one-third of this number.

Although carcinoma of the cervix is more frequent during the menopausal years, it is also observed at a much earlier period, and especially in patients, it is claimed, in whom an

artificial menopause has been induced, whether by irradiation or oophorectomy.

**DIAGNOSIS.**—The early diagnosis of cervical cancer is regarded as one of the most important factors governing its prognosis. Because of the suggestive symptoms associated with the disease, combined with its accessibility to examination, no special difficulty should be experienced in recognizing it in an early stage. Unfortunately, the disease, in most instances, is rather quite well advanced when first discovered.

Among 721 patients with cervical cancer treated in the department of gynecology in the Hospital of the University of Pennsylvania (1923-1929), C C Norris (*Pennsylvania M J* 33 287 (Feb) 1930) found that in only 71 (less than 10 per cent), could the disease be classed as early.

Certain factors may be held accountable for the rather tardy disclosure of the trouble. First, a patient, owing to modesty, fear or failure to appreciate the serious significance of abnormal bleeding or discharge, may have only herself to blame. Second, the physician may fail similarly in appreciating the ominous signs invariably associated with the trouble. Third, the disease itself may be looked upon as a simple lesion and be treated as such until it attains more than moderate proportions. Fourth, in certain types of insidious, infiltrating cancer, neglect to establish a diagnosis by biopsy, may lead to rather deep invasion and almost hopeless involvement. Fifth, failure on the part of the physician (probably most important of all), to prevent or correct lesions of the cer-

vix that may ultimately lead to cancer of the cervix

**FREQUENCY.**—The relative frequency of cervical carcinoma as compared with cancer of the uterine body, is, according to Mahle, 3.4 to 1. This observation is based on a study of 855 cases of uterine cancer

Cullen found a 25 per cent fundal malignancy in 176 patients, and Graves 22 per cent in 50 patients with uterine cancer.

G V. Smith, R H Smithwick and H Rogers (Am J Obst Gynec 15: 637 (May) 1928), in a critical analysis of 23,781 patients admitted to the Boston Free Hospital for Women, over a period of 51 years (1876 to 1927), found that 550 or 2.31 per cent were victims of cervical cancer, and that 101, or 0.42 per cent suffered with carcinoma of the uterine body, a ratio of 5.4 to 1

The greater frequency of cancer of the neck of the uterus is attributed to parturitional damage, with cellular alteration incident thereto

Farrar, in a study of 300 consecutive case histories, found that 288, or 96 per cent of the patients had given birth to children

Koblauch found cancer of the cervix in only 4.6 per cent of non-parous women, Edelberger in only 2.9 per cent, and Kroemer in only 1.77 per cent

Viewing these figures in the light of etiology, one is justified in assuming that it is injuries of the cervix inflicted during childbirth, followed by eversion, erosion and long, continued irritation and culminating finally in cell metaplasia of the endocervix that form the propitious background for the ultimate development of cervical malignant disease (P. B.

Bland. Pennsylvania M. J. 33:283 (Feb) 1930.)

## CLINICAL CLASSIFICATION OF CERVICAL CARCINOMA.—

The plan of clinically classifying the various forms of cervical malignancy as suggested by H. Schmitz (Surg. Gynec Obst 50 178 (Jan) 1930), has been generally accepted. Under this arrangement, 4 clinical stages are described:

Stage 1. Where the disease is definitely localized in the cervix and is represented by a nodule or ulcer not greater than 1 cm. in diameter. Under such circumstances there obviously would be no interference with uterine mobility. Chances for recovery in this type, according to Schmitz, are about 8 in 10

Stage 2. In this variety, there is some doubt as to the extent of the disease. The neoplasm involves one-half or all of the cervix in either the transverse or longitudinal diameter. It is associated with a "dough-like" consistency of the paracervical tissue. There is some inhibition of mobility due to loss of the normal elasticity of the circumjacent connective tissue. The outlook for recovery is placed as 4 in 10

Stage 3. This is marked by a tumor or crater of the cervix, with more or less involvement of the parametrium or the regional lymph nodes or both. Mobility of the uterus is very definitely diminished. Recovery dwindles to approximately 1 chance in 8

Stage 4. In this form, the disease is represented as in its terminal stage. There is definite infiltration of the parametrium, the regional lymph nodes or both. The uterus is fixed, there is secondary involvement of the bladder, rectum and vagina. The

pelvis is what is known as the "frozen type" Distant metastatic nodules may be found The prospect of recovery is *nil*

**HISTOLOGIC CLASSIFICATION.**—The relationship between the microscopic picture and the prognosis of the disease, first promulgated by Hansemann in 1893, was modified by Schottlander and Kermauner in 1912, and by Broders in 1922

The importance of this histologic classification has been re-emphasized by K H Martzloff (*Surg Gynec Obst* 47 183 (Aug) 1928) This writer stresses the advantages of an adequate microscopic examination of all specimens removed at operation This should include the study of numerous microsections taken from the cervical parametrium Sections collected should be cut at right angles to the longitudinal axis of the cervix Study should also include sections taken from the vaginal cuff, from the cervix itself, and from the corpus uteri, or at least to a point well beyond the macroscopic border of the disease

A study of this tissue is made in order to determine, (1) the extent of the process, (2) whether the tumor is of an adeno or epidermoid type, and (3) the predominant type of cancer cell With these data available, a prognosis may be given with a reasonable degree of accuracy as to the ultimate result following operation

Based on such a study, Martzloff (*ibid*) has shown that cancer of the cervix varies greatly in its degree of malignancy Aside from adenocarcinoma, the epidermoid growths may be divided into 3 large groups, each being designated according to the predominating type of cancer cell

Martzloff's classification is based on the fundamental conception of loss of differentiation or anaplasia of the cell types It was found that the predominant variety of cell present indicated the relative degree of malignancy

The 3 types are described as follows

(1) *Spinal Cell Type*—This is at one extreme and includes all cases in which the spinal type of cell predominates The cells are morphologically similar to those seen in the superficial zone of the stratum mucosum of normal stratified cervical epithelium They are usually polyhedral in shape, with well defined cell outlines The nuclei, many of which contain nucleoli, take only a moderately intense hematoxylin stain and are separated from each other by an abundant quantity of surrounding cytoplasm which is only lightly stained by eosin

(2) *Transitional Cell Type*—This embraces an intermediate form It is the most common variety While not distinguished grossly, it is distinctive microscopically Its cells resemble a well defined zone as seen in normal cervical epithelium, limited above by the characteristic spinal cell layer and below by the distinctive single celled basal layer They have a faint or undefinable cell membrane The nuclei take a deep blue hematoxylin stain and are closely placed, being separated by a deep eosin staining cytoplasm This is less prominent, though staining more deeply than spinal cells Nucleoli are commonly observed This tumor is highly cellular, intensely malignant and anaplastic Consequently it is regarded as especially susceptible to irradiation

(3) *Spindle Cell Type*—This is at the other extreme and is the least

common variety. It is composed of spindle shaped cells, manifesting a diffuse infiltrative tendency. Their nuclei assume a deep hematoxylin stain, are closely placed and separated only by a small quantity of eosin-staining cytoplasm. Nucleoli are only occasionally seen.

The percentage of "five year cures" following operation in the different types of epidermoid cancer is recorded by Martzloff as follows: spindle cell, 47, transitional cell, 24.2, fat spindle cell, 9.5. This observation closely parallels the report of the Mayo Clinic as published by Broders.

The question naturally arises whether a similar prognosis can be formulated, prior to operation, by biopsy.

In this respect, K. H. Martzloff (Tr. Am. Gynec. Soc. 53: 121-137, 1928) records an interesting study of 70 specimens of cervical cancer obtained by operation at the Johns Hopkins Hospital. In each instance biopsy material was available for comparison with the histology of the parent tumor obtained by panhysterectomy. He found that one-third of the biopsy material studied failed to indicate correctly the predominant variety of cancer cell in the parent tumor. Biopsy material accordingly cannot be utilized as a prognostic criterion prior to surgical intervention.

The possibility of dissemination of cancer cells by biopsy is sometimes raised. If the tissue is removed by means of a sharp knife and the edges of the wound are immediately seared with the cautery, all danger of dissemination, it is claimed, is practically eliminated.

**TREATMENT**—*Prevention*—Heretofore, too much stress has been placed on the early diagnosis of uterine

cancer, and too little on the prevention, early recognition and prompt correction of lesions which may lead to cancer. It is the preventive aspect of the problem which needs and is fortunately receiving more attention today. The morbid sequelæ of labor, assume in large measure, the role of precursors of uterine oncology of the malignant type.

No doubt, the more or less callous indifference to cervical trauma has been, in an indirect way, responsible for the rather widespread malignant invasion of the cervix. Unquestionably, the practice of submitting all patients to routine vaginal examinations during labor, with the irresistible impulse to dilate digitally, and slip the attenuated cervix over the presenting part, incidentally ripping the structure thereby, has been responsible for an inestimable degree of damage, with a train of immeasurable sequelæ.

To portray the outstanding value of cervical therapeutics as a means of prevention, F. A. Pemberton and G. V. Smith (Am. J. Obst. Gynec. 17: 165-176 (Feb.) 1929), in their study of 5962 patients upon whom trachelorhaphy, cervical amputation or cauterization had been performed, report that only 5 developed carcinoma subsequently. Huggins records 2985 cases of chronic cervical disease treated by cauterization or excision by the endothermic knife, without a single case of neoplasm developing thereafter.

Smith and his associates report 3650 patients who had cervical repairs performed with only 6 developing cervical malignancy. They also record the histories of 498 patients with cervical carcinoma, 486 of whom,

though suffering with cervical damage, were never repaired

Inasmuch as it is wholly impossible to determine what cellular alteration of a predisposing nature may take place, even in the short space of a few months following the laceration, the plan of the immediate repair rather than the intermediate or secondary, would have special advantages

*Active Treatment*—No wholly satisfactory therapy of carcinoma of the cervix is at present known. The ultimate mortality varies from 50 to 90 per cent

A comparison of the end results as recorded by various clinics is not satisfactory because of the varying standards of cure and the different methods of reporting statistics. The customary "five year" standard of cure has certain advantages, although the method suggested and generally followed in Europe of counting all untraced patients as dead has much to recommend it. This means of study probably stimulates a better follow up system

Although some difference of opinion still prevails as to the relative advantages of the present modes of therapy, the general trend is towards irradiation

**RADIUM**—Up until very recent years, or prior to the advent of radium as a means of therapy, the only method of treatment resorted to in cancer of the cervix, naturally, was surgery. Radium, as a therapeutic agent in all forms of cervical cancer, is considered by most observers in this country, the method of choice. It is also regarded in a similar light by the majority of European gynecologists. Gradually, in both this

country and in Europe, it is replacing the radical operation.

It has been shown, however, that in early cases, or those included in the stage 1 category, irradiation and radical hysterectomy do not differ materially in the ultimate results. In all other instances, the general consensus of opinion favors radium.

*Contraindication*—According to Schmitz (*loc cit*) and many other observers as well, radium is contraindicated in (1) general emaciation and cachexia, (2) anemia, with a red cell count below three million, and a hemoglobin under 50 per cent, (3) impaired nitrogen metabolism (radium may increase the blood nitrogen to a point which cannot be metabolized), (4) secondary involvement of the bladder or rectum, (5) frozen pelvis, (6) peri-uterine infection, (7) amenorrhea with pregnancy. (Radium therapy, it has been found, may result in maldevelopment of the fetus.)

*Histological Structure and Prognosis*—It has already been pointed out that the observations of Martzloff (*loc cit*) with regard to a histologic classification of cervical malignancy were based on observations made in connection with surgical therapeutics. This classification in its relationship to radium is entirely reversed, because it is now well known that the highly cellular undifferentiated and hence the most malignant growth, is especially sensitive to radium, or in other words, the most "radiosensitive."

C C Norris and M E Vogt (*S Clin N Amer* 7 315 (Apr) 1927) have shown that the basal and transitional types react more favorably to adequate irradiation, than do the more adult forms, such, for example, as squamous cell and adenocarcinoma,



the response being 71 per cent for the immature types, in comparison with 51 per cent in the more mature varieties

With respect to the end results, however, the number of "five year cures" is not materially altered, since the rapid development and the tendency to metastasis, characteristic of the embryonal form, counterbalance the special susceptibility of the tumor to irradiation

Norris believes that the result does not depend so much upon the histologic type of growth, but rather on the period when treatment is instituted

*End Results*—The plan of radiotherapy pursued for types 1 and 2 in the Philadelphia General Hospital, consists in the administration of 2400 millicurie hours, either in the form of the element, or properly screened emanation. In many instances, the administration is preceded by cautery excision. The cervix, bladder and rectum are protected by being pushed away, and having gauze packing interposed

In stage 1 cases, with the radium alone, Norris (Clark and Norris—"Radium in Gynecology," J B Lippincott, Pub, 1928) reports a cure in 46 per cent. Radium combined with cautery trachelectomy, he claims, is associated with cure in 80 per cent. Sometimes the application is repeated. In 2 or 3 weeks, even a third or fourth exposure is made if necessary.

In stage 3 cases, complete local healing occurred in 70 per cent. In all cases hemorrhage and discharge were controlled. Marked improvement in general health was observed in nearly all patients.

No attempt, it is claimed, should

be made to irradiate cases falling in stage 4 because of the danger of destroying the vaginal and rectal walls, thereby forming fistulous communications between those canals. Carefully administered, however, the element may be used even in this group, in a palliative way.

In addition to radium, the x-rays are also employed in all cases of cervical cancer in which hope is entertained as to the ultimate cure.

The results obtained by irradiation of carcinoma of the cervix in the Woman's Hospital, New York, are reported by G G Ward and L K P. Farrar (J A M A 91.296 (Aug 4) 1928). They employ radium salt in tubes or needles. They do not advocate massive dosage, as this may destroy normal cells. Better results are obtained, they state, by employing small initial doses, repeated if necessary, until from 2400 to 4200 mg hours are given.

The radium tube is anchored in the cervix and needles are placed in the broad ligaments, utero-sacral ligaments and in the cancerous tissue of the vagina. This canal is distended with gauze to prevent irradiation of the rectum and bladder. Blood transfusion is resorted to prior to administration in all patients showing signs of frank anemia.

In 1925, these investigators reported the results in 2, five-year series of cases. The percentage of cures in all cases was 23.6 per cent. In the early and borderline cases it was 52.9 per cent. They have completed 2 more five-year series and report on all patients treated between 1919 and 1923. The percentage of cures, based on a total of 134 cases treated, was 23.1 per cent. In the

early and borderline cases 53.1 per cent were cured.

At the Clinical Congress of the American College of Surgeons held in Chicago in October, 1929, J. Heyman (Surg. Gynec. Obst. 50:173 (Jan) 1930) reported the results obtained by operative treatment from all the statistics published in the literature of the world. These he compared with those obtained at the Radiumhemmet in Stockholm. The Radiumhemmet is controlled by the Swedish Government and all patients are required by law to report when requested.

Heyman's technic includes 3 treatments with radium salt, "the second, 1 week after the first, and the third, 3 weeks after the second." The total dosage for the 3 treatments is 2400 mg. hours in the uterus and 4500 mg. hours in the vagina. A heavy filtration, equivalent to 2 mm. of lead in the uterus and 3 to 4 in the vagina, is employed.

The combined use of x-rays and radium has been abandoned.

The comparative results of operation and radium from 20 leading surgical clinics and 17 radiologic clinics, together with the results obtained by Forsell and Heyman in the Radiumhemmet are summarized in the following tables.

Clinics	Total No. of Cases	Absolute Cure Rate, Per Cent	Per Cent Operable Cases
Operative Treatment			
Radiological Treatment	5,806	19.1	54.6
Radiumhemmet	3,512	16.3	
	790 (1914-23)	20.6	25.5

*Operable Cases Only.*

All Clinics	Total No. of Cases	Per Cent Cured
Operative Treatment		
Radiological	3,659	35.6 34.9
Radiumhemmet	188	40.4

*Primary Mortality*

	Total No. of Cases	Per Cent.
Radical Operation	3,257	17.2
Radiumhemmet	502	15.9

In a comparative analysis of statistics, one should bear in mind that a much more advanced group of cases come to the radiologic than to the surgical clinic. This is well exemplified in the report of Seuffert from the Doderlein clinic in Munich. During a 5 year period, from 1908 to 1912, 265 patients applied for treatment. Of these, 66 per cent were in the operable or borderline stage. Later, the plan of therapy in this clinic was changed to irradiation and during the following 4 years (1913 to 1916), 500 patients applied for treatment, of whom only 29 per cent were in the operable or borderline stage. Similar methods were adopted in other gynecologic clinics of Europe, notably in those of Baish, Menge, Kehrer, and Wintz.

From the foregoing figures, it seems clear that radium, as regards ultimate cure, is superior to surgery, to say nothing of the high primary mortality and remote sequelæ that follow radical hysterectomy.

G. T. Pack (South M. J. 21:205 (July) 1928) describes the method of procedure adopted by the Radium In-

stitute of the University of Paris Cultures are made of the cervical and vaginal flora of all patients on the initial visit. In those who develop severe pelvic infection following radium therapy, hemolytic streptococci have been invariably found, although not every patient harboring this organism develops pelvic inflammation. As a precautionary measure, a daily douche is prescribed until the day of treatment. One week after biopsy and bacterial study, the patient is admitted for treatment. The uterus is then explored, the cervical canal is dilated, and the patient is returned to bed. If no rise of temperature occurs within 24 hours, treatment is instituted. Prior to the application of the radium, cancerous vegetations are removed by diathermocoagulation. The radiologic treatment is continued for 5 days. Every morning during this period, the radium is removed, a douche is given, all materials are re-sterilized, and again inserted.

L J Stacy (Am J Roentgenol 19 323 (Apr) 1928) discusses the morbidity at the Mayo Clinic, following radiological treatment of carcinoma of the cervix. She reports that complications develop in about 18 per cent of the patients in contrast to 22 per cent seen in the treatment of benign disease.

A H Curtis (Surg Gynec Obst 50 182 (Jan) 1930) employs surgical diathermy as an adjunct to radium in the treatment of cervical cancer. He claims that this form of heat destruction possesses all the advantages of the actual cautery. Destruction of tissue extends to approximately twice the depth to which the tissues appear cooked upon incision, while the cancer cells are destroyed far beyond

this area. He points out that surgical diathermy is especially useful in cauliflower and necrotic growths. This adjunct will, he believes, add to the percentage of clinical cures.

**Surgery.**—The surgical treatment of carcinoma of the cervix dates back to 1895, when Ries suggested a radical operation, the main feature of which was the dissection of the ureters from the neighborhood of the growth.

Wertheim, in 1898, improved the operation by placing clamps across the vagina, whereby the growth was cut off from the uninvolved vagina beneath. This increased the operable cases from 25 per cent to 50 per cent and also increased, it is said, the number of "five year cures."

Perhaps no gynecological operation carries with it so much danger as the radical abdominal operation for cervical cancer. Especially is this true if the operator is not familiar with the technic. The principal hazards are a high primary mortality, early recurrence if radical removal has not been accomplished, and the possibility of damage to organs adjacent to the uterus, *i e*, bladder, ureters and rectum.

Operation in borderline cases is contraindicated because extirpation is seldom complete, and manipulation may favor metastatic extension.

**Indications.**—Operability, according to Schmitz (*loc cit*), depends on 5 factors.

(1) *Normal Mobility*.—The uterus, with a tenaculum forceps applied to the cervix, can be drawn down without resistance to the introitus vagina.

(2) *Patency of the Cervical Canal*.—This is tested by the insertion of a uterine sound. Stenosis is indicative of pyometra.

(3) *Afebrility of Patient*—This is determined so as to rule out infection such as parametritis, perimetritis, adnexitis and non-pelvic infections

(4) *Absence of Pathogenic Bacteria in the Genital Canal*—The pathogenicity of the cervical canal flora may be determined by the Ruge and Phillips test. Ten centimeters of defibrinated blood taken from the patient's vein and placed in a Petri dish, are inoculated with the cervical discharge. If cultures grow within 4 hours, pathogenic bacteria are assumed to be present.

(5) *Good Surgical Risk*—This depends upon the absence of grave metabolic disturbances: renal, cardiac, hepatic and pulmonary diseases, and severe degrees of anemia.

The absence of any one of these 5 conditions, in the opinion of this investigator, contraindicates surgery.

*End Results*—The so-called **Wertheim operation** which includes removal of the tubes, ovaries, uterus, parametria, vaginal cuff and adjacent iliac and sacral glands carries with it an operative mortality of from 5 to 42 per cent, due chiefly to septic peritonitis.

Weibel, with his wealth of clinical material and high incidence of operability, claims results for surgery which have never been equalled in this country, *i.e.*, 87 per cent cures in the incipient, 53 per cent in the mild, and 28 per cent in the advanced types.

V. Bonney (Lancet 1:277 (Feb 8) 1930), in a recent contribution, reports 284 radical operations performed in the Middlesex and Chelsea Hospitals for Women, and proclaims the superiority of surgery. These operations were all done by the end of 1924 so that the percentage of "five

year cures" could be ascertained. The results are portrayed in the following table:

Died of operation	47 (16.5%)
Recurrence before 5 years	107
Lost sight of before 5 years	12
Died of other diseases before 5 years	8
Well at end of 5 years	110 (38.7%)
Total	284

According to this observer, the high primary mortality, the principal objection to Wertheim's operation, is reduced with experience. This is depicted in the following table:

	No. of Operations.	Primary Mortality, Per Cent
1907-1915	110	20
1916-1924	174	14.3
1925-1929	8	8.1

This reduction in the primary mortality is attributed by Bonney to several factors employed in his technic:

(1) Spinal anesthesia combined with full ether anesthesia, in order to diminish the traumatic shock, alone accountable for over 30 per cent of the operative deaths.

(2) Sterilization and tight packing of the vagina with gauze soaked in violet green.

(3) Protection of the abdominal incision with 2 layers of sheet rubber to avoid malignant infection of the raw surfaces.

(4) Removal of all or almost all of the vagina, and packing of the cavity with gauze with 1 to 2000 acriflavine solution.

(5) Removal of the regional nodes.

(6) No pre-operative radiation. (Bonney believes that radiation increases the difficulties of the operation, especially if a considerable in-

terval has elapsed between it and the radical extirpation )

(7) No radiologic treatment after operation

The chief advantage of surgery, in the opinion of this investigator, is that it affords a definite chance of permanent cure even to patients in whom the regional nodes are cancerous by the time they seek advice. With radium, on the other hand, most of these patients are beyond cure.

A comparison of the results of all cases studied by Bonney and Wertheim is shown in the following table

	Cases Seen	Cases Operated Upon	Operability Rate	Primary Mortality Rate, Per Cent	Five Year Cure Rate, Per Cent.	
					Based on Cases Operated Upon	Based on Cases Seen
Bonney	450	284	63	16.5	38.7	24.4
Wertheim	979	450	46	19.0	41.3	19.0

The conclusion drawn by Bonney is that the largest number of cures is obtained by operating upon the operable cases and treating the remainder by radium.

**CORPUS CARCINOMA.**—Although carcinoma of the uterine body is less common than cervical cancer, it is by no means infrequent. Occurring mostly after the menopause, it is nevertheless fairly common in women less than 45 years of age. In a series of 333 cases reported by L. J. Stacy (Surg. Gynec. Obst. 49:43 (July) 1929) from the Mayo Clinic between 1907 and 1923, 10.5 per cent occurred in women less than 45 years of age.

Metrorrhagia was the most common symptom and was the first noted in 63.6 per cent of the patients.

**TREATMENT.—Prevention**—In discussing the preventive feature of corpus carcinoma one must call to mind the etiologic role possibly played by uterine myomas and endometrial polyps. In 124 patients suffering with endometrial carcinoma, fibroids were encountered by Stacy in 37 per cent.

In 12 patients (3.6 per cent) myomectomy had been performed previously. Polyps of the endometrium were observed in 7 patients or 5 per cent. In some instances the polyps themselves were the seat of malignant degeneration, while in others

their presence seemed to be etiologically responsible for carcinomatous development.

The suggestive symptoms of hemorrhage and discharge may, accordingly, be attributed to the myoma and the coexisting malignant process overlooked. It is imperative, therefore, that a diagnostic curettage should precede irradiation in all cases of apparently benign hemorrhage.

**Surgical Therapy**—With regard to the treatment of body carcinoma, it is almost universally conceded that operation and not irradiation should be adopted. The impression is more or less general that body carcinoma is readily amenable to surgical treatment.

C. C. Norris (Pennsylvania M. J.

33 287 (Feb) 1930), however, believes that the disease is more refractory than heretofore assumed. In 101 consecutive cases in all stages of development treated in the Hospital of the University of Pennsylvania, "five year cures" were obtained in only 34.5 per cent. In the early cases, "five year cures" were reported in 60 per cent. The writer referred to, as a result, is now applying a combination of radium and surgery.

Two or three days prior to operation, 2500 millicurie hours of radium are administered. The administration is preceded by a diagnostic curettage, and the radium itself not only is deleterious to the carcinomatous cells, but in addition, seals the lymphatics, thereby preventing extension.

Because adenocarcinoma of the body is composed of an adult type of cell, it is more resistant to radiation, and hence, a relatively larger dose is always administered. J. O. Polak (Am J Obst and Gynec 15:26 (Jan) 1928) also employs this dual type of therapy in fundal cancer. The administration is made 4 to 6 weeks previous to a semi-radical type of hysterectomy.

With regard to the final results, L. J. Stacy (Surg Gynec Obst 49:43 (July) 1929) reports that the largest number of patients who succumbed from recurrence at the Mayo Clinic, died during the first 3 years after operation. Quite a number of patients developed a return of the disease after the fifth year, and hence, it has been suggested that the term, "five year arrested cases" be used rather than "five year cures."

In a series of 133 patients operated upon, there were 18 post-operative

deaths, a mortality of 5.4 per cent. Of a total of 288 patients, who were traced, 184, or 63.8 per cent lived more than 5 years.

J. Heyman (Surg Gynec Obst 50:173 (Jan) 1930), in discussing the treatment of body cancer, favors surgery in all operable cases, combined with post-operative irradiation. All inoperable cases are treated by irradiation. The type of treatment to pursue in the border-line cases depends on the size and shape of the uterine cavity. Surgery is preferred, when the uterus is large and irregular, radium when the cavity is narrow and regular in outline. Narrowness favors the more intimate contact of the radium with the uterine growth.

It is interesting to note, that in a series of 26 inoperable cases of corpus carcinoma, treated by radiologic methods, that 26.9 per cent were absolutely free from recurrence for more than 5 years.

With regard to the operability of fundal cancer, Heyman (*loc cit*), in a study of 9 surgical clinics, found that this varied from 62 to 100 per cent. "Five year cures" were obtained in from 24 to 59.1 per cent. The average, including all patients, was 42.8 per cent. The recovery in the so-called operable cases treated by radium, is recorded at 58.8 per cent.

Finally, it seems apparent, that until more statistics are available with respect to the value of radium therapy in endometrial cancer, that hysterectomy will remain the procedure of choice.

**PYOMETRA FOLLOWING RADIUM THERAPY.**—Cervical atresia with retention of infected material within the uterine cavity, customarily called pyometra, has gen-

erally been regarded as an entity of rather infrequent occurrence. Since the advent of radium as the accepted mode of treatment of cervical carcinoma, however, the incidence of this complication has materially increased. From a study of cases treated with radium, P. B. Bland (Am J Obst and Gynec 17 528 (Apr) 1929) found that approximately 1 out of every 100 developed pyometra. Norris, in a personal communication, reports 5 cases of pyometra in 600 cases of cervical carcinoma exposed to radiotherapy. Kelly writes that he has treated more than 1900 uterine cancers with radium and observed several cases of pyometra subsequently.

This malady, especially the incomplete variety, is much more frequent than hitherto suspected. The frequent complaint of patients suffering with malodorous discharge, a discharge not constantly blood tinged, especially if associated with intermittent attacks of mid-pelvic pain, extending over a period of several weeks or months after the application of radium, leads one to speculate as to whether partial stenosis of the cervix, with retention of infected material within the uterine cavity, is not responsible.

With respect to the mode of origin or development of post-irradiation pyometra, it is necessary to recall the effect of radium on neoplastic tissue in general, converting it into dense fibrous material.

The typical picture of the cartilaginous or frozen cervix, post-irradiated cancerous cervix, needs no discussion. The formation is due fundamentally, to fibrosis, followed by contraction and cohesion or fusion of the cervical walls.

The fluid accumulation results from associated inflammatory changes in the endo- and myometrium, lesions almost invariable accompaniments of cervical carcinoma. That the fluid is inflammatory in origin is based on the observation that the normal secretion of the endometrium is almost *nil*. According to Lomon, it is insufficient to create, even in cases of atresia of the cervix, an appreciable collection.

With respect to infection, one may say that a cancerous area is literally blistering with all forms of pathogenic bacteria, and, hence, the accumulating fluid becomes infected from a cavity already teeming with infectious organisms.

Rapid development is not the rule. More than 75 per cent of the cases are of a semichronic type, developing slowly and not giving rise to symptoms before 3 or 6 months.

Polak's (*loc cit*) cases arose within 3 months and all of Norris's within 6. Spalding observed 1 case in a patient 4 weeks after irradiation and in another, 7 months following treatment. Sireday and Gagey, in discussing this feature of the trouble, report 1 case arising 2 years after the application of radium.

In a small number of instances the process of development is extremely tardy and symptoms may not arise for a year or more. In 2 of 3 patients, subjective symptoms, expressed in pelvic discomfort finally amounting to severe pain together with tenderness and uterine enlargement, arose at the end of 2 years and in the third, at the end of 7 years. In the first 2 patients the symptoms at the beginning were not severe, and they did not apply for relief until 3 years elapsed from the date of treatment. The third patient's

symptoms began nearly 7 years after the application of radium

In considering the *prognosis*, one may say that, provided the cancerous state of the cervix is completely eradicated, the ultimate outcome is favorable. In the *incomplete* type, catheterization of the uterus with or without lavage usually relieves the condition by establishing free uterine drainage. In the *complete* type, if catheterization is impossible, **hysterectomy** is indicated. Early recognition of the disorder is of considerable prognostic value, because failure to establish a diagnosis promptly may lead to danger in 2 respects

First, by assuming recurrence of the cervical carcinoma, there is danger that the surgeon will make the mistake of administering a new series of radium treatments, a measure which would certainly lead to still more serious consequences

The second danger lies in the possibility of prolonging the period of complacency until the retained fluid under high pressure spontaneously rends asunder the uterine wall. Accidents of this type have been reported

**PREGNANCY AND CARCINOMA**—The association of cancer of the cervix with pregnancy, although infrequent, is of serious significance due to a more rapid growth and earlier metastasis than in the non-pregnant uterus. This is the result of the extreme vascularity of the process incident to gestation and the earlier age of the patient afflicted

In the *differential diagnosis* one must be careful to rule out benign lesions, such as lacerations and versions which, because of the extreme congestion of pregnancy, are prone to bleed freely on manipulation. Simi-

larly, hemorrhage from cancer complicating pregnancy may be attributed to a complication such as placenta previa. In all cases of doubtful diagnosis, biopsy examination should be practised

The *treatment* depends upon the period of pregnancy and the stage of the cancerous process. In early gestation it is advisable to irradiate the carcinoma, at the same time **evacuating** the uterus either by **curettage** or **anterior vaginal hysterotomy**.

The likelihood of an abortion or the birth of a microcephalic child as the result of irradiation, provided the uterus is not emptied, must be borne in mind

If the carcinoma is well advanced, evacuation is not without danger, owing to infection, laceration and hemorrhage. The uterus should be emptied, however, if at all possible

Deep x-ray therapy of the pelvis generally produces abortion in from 5 to 40 days. Irradiation of the cervix, it is said, is less likely to cause abortion, although opinions differ on this point

In the middle of gestation, evacuation of the uterus is more difficult. If the carcinoma is found fairly early, Norris advocates **cautery excision** of the cervix, combined with an **anterior hysterectomy** and evacuation of the uterine contents. This course is to be followed by immediate irradiation of the cervical stump. In certain cases, radiologic treatment followed by **Cesarean section** near term is regarded as the treatment of choice

Toward the end of gestation an early carcinoma should be fully radiated. In more advanced cases it may be advisable to perform abdominal



delivery and then apply radium therapy. Obviously, any attempt to deliver a mature child through a cancerous cervix would only court disaster

### EDUCATION OF THE PUBLIC.

—The systematic examination of all women once or preferably twice yearly, if such a thing were feasible, during the cancer years would unquestionably prove not only one of

the most effective means of the early diagnosis of uterine cancer, but its partial control as well. The adverse criticism one occasionally hears concerning educational campaigns against cancer lacks justification. All in all, by presenting the menace of cancer to the public, we are not, as Moynihan so tritely says, scaring the people to death, but literally frightening them into life.

## V

**VACCINE THERAPY.**—Attention was called lately in the German literature to a specific biologic function of the skin as a protective organ against the pathologic micro-organisms and their toxins. According to the conception of some authors, the skin has its own endocrine system that may be stimulated by local irritation to an increased secretion of immunizing bodies. Hildebrand (Schweiz med Wchnschr 59 367 (Mar 30) 1929) reports good results obtained by the *interdermal vaccination* treatment of various diseases. He rubbed small doses of *Ponndorf's* or *Paul's skin vaccines* into the superficial skin scarifications in 250 cases of tuberculosis, avoiding local or general reaction, and observed especially good results in **chronic pulmonary tuberculosis**. In 200 cases of rheumatism of various kinds, treated with *Paul's vaccine* administered intradermally, the best results were observed in **chronic articular rheumatism**, **myalgia** and **neuralgia**, the least satisfactory results were noted in **arthritis deformans**. The same treatment was successful in some cases of **bronchial asthma**, in **exophthalmic goiter** and in **chronic eczema**.

Intradermal vaccination therapy resembles non-specific protein therapy, but the stimulation of the production of the non-specific defense bodies in the organism is enhanced by the intradermal administration of the vaccine, which stimulates a specific hormone protection in the skin.

P. Poincloux (Presse méd 37 925 (July 17) 1929) claims to have obtained striking

results in vaccine treatment by a regional method of injecting the vaccine into the port of entry of the infecting organism—that is, the tissue by which it first entered the body. Thus, in **gonorrheal arthritis**, injections are not made into and around the joint, but into the walls of the urethral orifice, and, in **otitis media**, into the walls of the orifice of the Eustachian tube. **Gonorrheal infections** in the male are treated as just stated, and in the female, injections into Skene's glands. In **B coli infections**, injections are made into the mucosa of the colon with the aid of a proctoscope. Regional vaccine therapy is employed also in staphylococcal infections, thus in **mammitis** the vaccine is injected into the nipple. In cases of infection by multiple microbes, injections of 1 of these are first made, followed by injections of the other. In giving the injections a syringe graduated in tenths or a cubic centimeter, local anesthesia with stovaine, and the fine needles 5 to 6 mm long are used, but these vary with the site treated. The initial dose of gonorrheal vaccine is 0.25 c.c., which is increased by the same amount at each treatment. The initial dose of B coli vaccine is 0.5 c.c. A rise in temperature and malaise are noted after the first 2 injections. The reactions after injections of B coli are less marked but more persistent than after gonococcal ones. Poincloux reports great success following this method in 185 cases of various infections, some of which are described in detail.

T. M. Rivers, H. Stevens and F. L. Gates

(J. Exper Med 47 37 (Jan) 1927) found that rabbit skin treated for a few minutes with ultraviolet light and then inoculated at once with vaccine virus is less susceptible to the action of the virus than is untreated skin. If 24, 48, or 72 hours elapse between the time of irradiation and inoculation, the treated skin appears to be more susceptible than is the untreated skin. Skin repeatedly exposed to ultraviolet light is less susceptible to the action of vaccine virus than is non-irradiated skin.

R A Kinsella (J A M A 93 1524 (Nov 16) 1929) states that it is necessary to consider whether vaccines are useful in the treatment of lobar pneumonia and hemolytic streptococcus infections and also whether the so-called non-specific stock vaccines are useful enough to justify their continued employment. Vaccines are presumably given on the theory that the resistance to an acute infection may be heightened by the injection of these materials either under the skin or into the blood stream. The correctness of this theory is questionable, and the practical results obtained with the use of these antigenic substances in acute infections, such as lobar pneumonia, do not justify their continued employment. It is true that there are examples of peculiar shortening of the course of lobar pneumonia following the injection of some material which disturbs the patient to the extent of producing chills and fever. These results were also observed when non-specific substances such as horse serum were followed by this febrile disturbance. These occasional experiences, he states, do not justify the use of antigenic substances for the treatment of lobar pneumonia or in the treatment of hemolytic streptococcus infections.

Concerning the use of non-specific vaccines, it can be said that definite clinical effects are produced frequently which lead both the patient and the physician to feel that some good has been accomplished. These non-specific reactions are widely employed in the treatment of conditions such as chronic rheumatism. The continued use of these products need not be discouraged altogether. When employed they should be used with care and discretion. We should always keep in mind the limitations attending such use.

### VAN DEN BERGH TEST.—

In nearly all of the latest studies of jaundice, both clinical and experimental, the van den Bergh test has been used as a means of obtaining information. This attests to its popularity, but at the same time the notes show that the results obtained have not led to any unanimity of opinion as to the underlying physiology and pathology.

H Hayashi (Presse méd 37 720 (June) 1929) studied the reaction in hemolytic and obstructive jaundice produced experimentally in dogs and found a delayed reaction in hemolytic as compared with obstructive jaundice. He then destroyed the bilirubin in the blood samples by exposure to sunlight and added bilirubin to the respective bloods. A rapid reaction occurred in serum from normal dogs or from those with obstructive jaundice, while he obtained a delayed reaction in the serum of dogs with hemolytic icterus. Apparently something in the sera influenced the test since the bilirubin added was the same in both cases. He also found that the addition of bile salts to serum did not influence the rapidity of the reaction.

After ligation of the bile ducts of dogs, E S G Barron and J H Bumstead (J Exper Med 47 999 (June) 1928) found first an indirect reaction for several hours and then a direct reaction. This is interpreted as follows: the first bilirubin is that normally circulating in the blood, the next is that appearing from the liver as a result of the back pressure.

**VARICES.** See VARICOSE VEINS AND VARICES

**VARICOCELE.**—Five hundred cases are reported by M F Campbell (Surg Gynec Obst 47 558 (Oct) 1928), who classifies 3 types (1) A symptomatic varicocele of which the patient is unaware These are best left alone (2) Moderate or large size varicocele Its presence is denoted anatomically by scrotal enlargement and symptomatically by a feeling of weight, pain or a dragging sensation either in the testicle or referred to the cord, groin or loin Operation benefits these cases (3) Small varicoceles which cause symptoms disproportionate to the objective findings Most varicoceles are of this type These patients are grouped as sexual neurasthenics, and are best treated by the institution of common sense sexual and physical hygiene. A scrotal suspensory will relieve many

**VARICOSE ULCERS.—TREATMENT.**—H O McPheeters (Surg, Gynec and Obst 47 469 (Oct) 1928) reports what many others have noted, that it is possible to cure the ulcer by injecting the vein He thinks the attempt to cure the ulcer first and then the vein is wrong in theory and practice Excellent results for recent ulcers as well as those of long standing were reported in the discussion on the treatment of varicose ulcers by intravenous injections by MacLeod, Sicard, Forestier, Gaugier and others (Proc Roy Soc Med, London, 21 1823, 1928, R Gibson and A R Somerford (Brit M J (June 9) 1928) and K Patterson Brown (Edinburgh M J. 35.472 (Aug) 1928) substantiate these claims

**OPERATIVE PROCEDURES** have also given good results, and H H.

Trout (Arch Surg. 18·2281 (June) 1929) reports a series of 26 cases, 25 of which were successful The author advocates the method used by Kondoleon in his treatment for elephantiasis with wide excision of the ulcer and the employment of total-thickness skin grafts when possible The Thiersch method of transplantation in clean cases is favored by Hartung (Zentralbl f Chir 54 2528, 1927)

**MEDICATION**—J H Young (Lancet 1:976 (May 11) 1929) uses a 5 to 10 per cent. solution of magnesium sulphate. The patients were all confined to bed, with the foot of the bed elevated Soaks of magnesium sulphate were applied thrice daily In more than 80 per cent. of the cases this treatment resulted in healing Insulin pomade was used by L M Pautrier and Mlle A Ullmo (Bull Soc franç de dermat et syph 54 826 (Dec) 1927) in a patient 64 years old, with a blood sugar of 120 Gm upon an ulcer of 14 years' duration The ulcer completely cicatrized within 20 days

Neoarsphenamine in a 1 per cent ointment was used by E E Marcovic (Arch Dermatol and Syph 18 290 (Aug) 1928) with good results A layer of the ointment is applied only once, at night, over the surface of the ulcer This treatment proved so painful that an anesthetic was added Following this 1 application, a 10 per cent bismuth subgallate ointment was applied for the next few days A series of 12 successful results is reported

The use of cerecloth is advocated by L de Gaetano (Polislinico (sez prat) 36 113 (Jan 28) 1928) upon ulcers which have previously been

prepared by cleansing the skin, riding it of the eczema and stimulating by the application of silver nitrate followed by the use of scarlet B. This preparatory stage varies in length from a few days to 20, depending upon the condition of the lesion. The strips of cerecloth are then applied in spiral fashion from the base of the toes up to the knee. The strips are 2 to 2.5 cm wide by 30 cm. long. Redressing is done every 5 to 10 days, depending upon the amount of secretion present.

**VARICOSE VEINS.—VARICES.**—A case of *varix* of the *umbilical cord* is reported by F. L. Adair and R. E. McDonald (Am J Obst and Gynec 17 836 (June) 1929). In a review of the literature of cord anomalies, they found only 3 cases mentioned. In the authors' case, the tumor measured 12.2 cm from the fetal pole to the placental pole and 9.8 cm through its greatest breadth. These measurements were taken with the varix in a partial state of collapse. It was, therefore, probably larger when fully distended with blood prior to its rupture.

**ETIOLOGY**—A. Bernsten (Acta chir Scandinav 62 61, 1927) divides varices into four types: (1) isolated saccular, (2) tortuous, (3) solitary dilated and hypertrophied, and (4) fine cutaneous dilatations. He classifies the causes under three headings: Heredity, female sex, and age before 30.

Obstructive conditions are emphasized by C. E. Rushin (J M A Georgia 18:238 (June) 1929) as follows: (1) Tight garters, (2) obstruction developing at the oval window in the fascia lata. The superior edge

and the inferior cornu resting under the superficial saphenous cause pressure as the vein joins the femoral, (3) pressure in the veins above Poupart's ligament, as from the pregnant uterus, constipation, pelvic masses, (4) occupations requiring prolonged standing, (5) endocrine disturbance.

I. S. Tunick, S. Dubin and A. Schmier (Am J Surg 6 479 (Apr.) 1929) think the etiology due to one or more of the following: (1) Endocrine disturbances from the ovary and pituitary body, (2) general weakness of the structures of veins associated with other weakness of body tissue as in flat feet, enteroptosis, etc., (3) loss of neuromuscular tone of vein wall (Kashimure), (4) infection of vein wall, embolic in nature, superimposed upon a hereditary predisposition, (5) trauma, producing inflammatory or cicatricial bands and constricting the veins, (6) inactivity, reducing normal circulation.

Heredity as an important etiologic factor is indicated by B. B. Nicholson (Arch Surg 15 351 (Sept.) 1927) who, in a series of 112 cases, found an hereditary history in 55 per cent. He questions the influence of cardio-respiratory diseases, and thinks pregnancy plays only a secondary part.

Histopathological studies of a varicose vein by H. G. Pretty (Canad M A J 20 481 (May) 1929) showed thickening of intima and especially the media, fibrosis and loss of longitudinal muscle in the adventitia and intima, with loss of internal elastic membrane, change of circular muscle of the media to longitudinal muscle, and finally loss of all muscle fibers in the intima.

Venitis (Sicard) is contrasted with phlebitis by E. A. Melkon (New Eng-

land J Med 200 690 (Apr 4) 1929). In venitis he finds (1) swelling of the endothelium which spreads to coats of the vein The blood ceases to flow and a thrombus or clot is formed, (2) clot becomes fixed, (3) organization Phlebitis on the other hand, is due to infection and causes edema with pain in the leg, whereas venitis is an aseptic inflammation without pain The production of venitis is the aim of the injection treatment

**TREATMENT.**—The injection treatment which largely has superseded all other methods of treating varicose veins of the leg, is the instillation of a chemical into the lumen of the vein in question As a result the vein is thrown into a state of reaction (venitis) and final sclerosis. The chemicals, in solution, known as sclerosing solutions, must be of sufficient concentration to cause or set up a reaction with the lining of the vein and its contained blood Sodium salicylate in 20 to 40 per cent concentration, sodium chloride, 20 to 40 per cent, glucose or invert sugar, 50 per cent, are used, also quinine hydrochloride, 0.4 Gm (6 grains) and 0.2 Gm (3 grains) urethane in 3 c c (48 minims) distilled water, red mercuric iodide, 1 c c gm ( $\frac{1}{6}$  minim) in 1 c c (16 minims) distilled water, mercuric chloride 2 to 10 c c ( $\frac{1}{2}$  to  $2\frac{1}{2}$  drams) of a 1:1000 solution as well as combinations of sodium salicylate and sodium chloride, or either of these with 50 per cent dextrose solution. To increase the local effect a tourniquet is applied and left on during and from 3 to 10 minutes after certain of these injections

J. Forestier (J A M A 90 1932 (June 16) 1928) uses 20-30-40 per cent. solutions of sodium salicylate,

starting with 3 to 5 c.c. ( $\frac{3}{4}$  to  $1\frac{1}{4}$  drams) of a 20 per cent solution. If the proper reaction is not obtained, he increases this to 30 and 40 per cent, but finds these higher concentrations give severe cramps for a few moments. If this solution fails, he uses red mercuric iodide. This is a slower-acting solution, and he recommends quinine and urethane for quicker and more intense results

P K Murphy (Brit M J. 1:145 (Jan 26) 1929) uses only solutions of sodium salicylate, beginning with 2 c c ( $\frac{1}{2}$  dram) of a 20 per cent solution and increases up to 6 c c ( $1\frac{1}{2}$  drams) of a 40 per cent solution

W. Wolf (M J and Rec 127:416 (Apr 18) 1928) recommends the addition of a local anesthetic to overcome the cramp-like pain Murphy, however, points out that pain indicating a perivascular injection is a valuable sign in preventing a complicating slough Furthermore, the intravenous injection of a local anesthetic into a blood-vessel is a dangerous procedure, especially if an adequate tourniquet is not used

Beneficial effects upon varicose ulcers are reported after salicylate injections by T J Grau and J Govantes (Rev méd cubana 40 318 (Mar 1929) From an orthopedic point of view, M B Cooperman (M J and Rec 129 541 (May 15) 1929), in a series of 62 patients and using 500 injections of 30 to 40 per cent solution sodium salicylate, 10 c.c. ( $2\frac{1}{2}$  drams) to each injection, reports good results and thinks that chronic hypertrophic villous synovitis of the knee-joint and other secondary degenerative processes in joints, including hypertrophy, fibrosis and osteo-arthritis, are often

caused by varicose veins and that sclerosing solutions, therefore, offer a useful remedy. Likewise, Mekon finds this sclerosing solution gives excellent results. It is safe, easy to administer, and inexpensive as compared to the operative method.

**Sodium chloride** in 20 per cent solution is considered by Martin H Gold (Med. World 47 314 (Sept) 1929) preferable to sodium salicylate, as no cramp-like pains follow the injection. He uses 3 to 10 c c ( $\frac{3}{4}$  to  $2\frac{1}{2}$  drams), depending upon the type and size of vein. The thrombi formed with this appear denser and firmer than those from the salicylate. Similarly, I S Tunick, S Durbin and A Schmier (*loc cit*) find **salt solution** preferable to salicylate. Out of the vein, however, it produces a larger slough which is slower in healing. The pain is attributed by G H Colt (Brit M J 2 848 (Nov 9) 1929) to stimulation of the arborescences of the myelinated fibers intermingled with the non-myelinated fibers, ending partly in the adventitia and partly in the intima. The pain spreads and becomes more intense, and the counter-irritation in one part so distracts the patient's attention that the exact course cannot be located in any one vein.

Combinations of **sodium salicylate** and **sodium chloride** have also been used with good results. R Maingot and C H Carlton (Lancet 1 806 (Apr 21) 1928) use the following solution: Sodium salicylate 25 per cent and sodium chloride 10 per cent in equal parts. This they recommend when the veins are large and covered with healthy skin. They advise **quinine urethane** for small veins, however. These statements

are substantiated by G H Colt (Brit M J 2 525 (Sept 22) 1928).

A combination of 20 per cent **sodium chloride** and 50 per cent **glucose** was used by L A Greensfelder and R I Hiller (Surg, Gynec and Obst 49 639 (May) 1929) experimentally upon dogs, with good results. When used separately, they found sodium chloride more effective than glucose, but more irritating when injected extravascularly. The thrombi formed were more uniform with sodium chloride than with dextrose. Also the effect on the elastic tissue of the vein was more marked with sodium chloride. One case of auricular flutter developed, however, with sodium chloride, but none with glucose.

The use of **glucose**, 40 to 50 per cent, solution in a series of 96 cases is reported by R C Logefeil and A W Dahlstrom (Am J M Sc 177 690 (May) 1929) who compare this with 28 cases that received 63 injections with 20 per cent **sodium chloride**. Four of these cases developed sloughs, whereas with the use of glucose only 1 case of sloughing developed. They found the sclerosing effect of the glucose fully as good. In 4 cases extensive sclerosis occurred of the internal saphenous magnus.

Babcock for 6 years has used 2 to 10 c c ( $\frac{1}{2}$  to  $2\frac{1}{2}$  drams) of a 0.1 per cent solution **mercuric chloride** with much satisfaction. For very large and rebellious varices **quinine** and **urethane** is injected.

**Vasoligation** in combination with the injection of **glucose solution** is practiced by L Moszkowicz (Zent f Chir 54 1732 (July 9) 1927). Injection and ligation are carried out

at the highest point of the ligated vein, usually in the upper third of the thigh. Following exposure of the vein, a double ligature is thrown around the vessel and then 20 to 40 cc (5 to 10 drams) of the glucose solution are injected. After this the wound is closed with Michel skin clips. The entire limb is then encased in a rubber bandage. He reports 150 cases with good results, using this method only in cases of marked varices in persons doing hard work. Many other surgeons have found ligation entirely unnecessary. Rarely a dissenting voice is heard. Thus, the injection method of treatment of varicose veins is still "on trial" and does not offer as yet any advantage over surgical procedures, according to J. Muller (*Beitr z klin Chir* 144 424 (Oct 15) 1928). He analyzes 115 cases treated by high ligation. In cases of varices of the lower extremities, the author sees a place for injection, but in cases where the Trendelenburg test is positive he prefers the high ligation of the saphenous vein. However, in a statistical study on 119 answers to a questionnaire, H. O. McPheeters (*Surg, Gynec and Obst* 48 819 (June) 1929) shows the mortality rate from pulmonary embolism following the operative method to be 0.53 per cent as compared with 0.00754 per cent following injection method. The number of non-fatal pulmonary emboli are almost negligible after the injection treatment, compared with the frequent occurrences after surgical treatment. Following operation, there is 0.41 per cent mortality from secondary pneumonia, whereas this is rare following the injection method. Further, the

operation requires an average of 15.1 days in the hospital, whereas the injection method requires no hospitalization.

Similarly, as a result of a questionnaire, N. J. Kilbourne (*J A M A* 92 1320 (Apr 20) 1929) collected 4607 cases treated by excision, with 8 deaths from emboli and 10 deaths from unknown causes. This is contrasted with 53,000 cases treated by injection, with 11 deaths. Further, the incidence of recurrence is only one-sixth as high following the injection method as compared with the operative method.

The rarity of embolism following the injection method is explained by H. O. McPheeters and C. O. Rice (*Surg, Gynec and Obst*, 49 29 (July) 1929) by stating that in all varicose veins of the lower extremities the circulation is either stagnant or reversed, and the chemically induced thrombus is forced distally toward the smaller and branching veins, where it will be most certainly arrested.

Embolism as a complication is to be feared following the injection method when phlebitis is present or has been present within 6 months, in the opinion of H. O. McPheeters and C. O. Rice (*J A M A* 91 1090 (Oct 13) 1928). Such a case of fatal embolus is reported by Kuhnau (*Zentralbl f Chir* (Oct 12) 1929). He does not know the solution used for injection, but after 4 days in bed in a hospital the patient had severe pains in the leg and symptoms of pulmonary embolism. The following day, a secondary fatal embolism occurred in the lung.

Arteriosclerosis, diabetic gangrene, and thrombo-angitis obliterans are often associated with venous dilata-

tion and inflammation. The recognition of these conditions as of great importance in the treatment and prognosis is emphasized by G. de Takats, H. Quint, B. I. Tillotson and P. J. Crittenden (Arch Surg 18: 671 (Feb) 1929).

Following the injection treatment, F. Reynolds (Lancet 2: 919 (Nov 3) 1928) reports an overgrowth of hair over the obliterated external saphenous vein, from ankle to knee, which at first was longer, denser, and darker than the natural hair of the leg.

**CONTRAINDICATIONS** to the injection methods of treatment given by H. M. Kern and L. W. Angle (J. A. M. A. 93: 595 (Aug 24) 1929) are (1) Obstruction of the deep veins, (2) active or latent phlebitis, (3) arterial disease of the extremities (Reynaud's and thrombo-angitis obliterans), (4) cardiac diseases.

The editorial from Surgery, Gynecology and Obstetrics for July, 1929, sums up the **injection method** of treatment of varicose veins by saying: "When we consider the comparatively high incidence of pulmonary embolism following the radical removal of varicose veins, when we consider the almost entire absence of saphenous thrombi as the source of fatal pulmonary embolism, when we consider the important fact that these patients are not immobilized at all but encouraged to pursue their daily work, thus eliminating the factor of stasis in the formation of spontaneous clots, we can feel justified in advising the injection treatment, even if the theoretical possibility of a thrombus breaking loose is admitted." However, **surgical procedures** are still employed in certain selected

cases. No new method can ever displace entirely the fruitful work of master surgeons, who have contributed to the surgery of varicose veins. The injection treatment is simple, safe, effective, and economical, and may be rapidly discredited unless used in the proper place.

**VARICELLA (CHICKEN-POX).—CHICKEN-POX AND HERPES ZOSTER**—The relation between chicken-pox and herpes zoster continues to be discussed. J. B. Shelmire and B. Shelmire (Arch Dermat and Syph 17: 687 (May) 1928) estimated that about 250 to 300 instances had been recorded in the literature in which chicken-pox followed exposure to herpes or *vice versa*. They added a report of a patient under their own observation who developed herpes zoster on the right side of the face, on the right side of the tongue and on the mucous membranes of the right cheek. A generalized vesicular eruption resembling chicken-pox broke out a few days later, a laryngeal obstruction developed which required tracheotomy and the patient died of a complicating pneumonia. At necropsy, the right Gasserian ganglion and its nerve fibers contained areas of hemorrhage, necrosis and lymphatic infiltration. A child who had no other known exposure except to this patient developed chicken-pox 14 days later.

**INCIDENCE**—In a statistical review of the seasonal and age incidence of herpes zoster at the Bellevue and Vanderbilt Clinics and of chicken-pox as reported to the Department of Health of New York City, T. M. Rivers and L. A. Eldridge,



Jr (J Exper Med 49 899 (June) 1929) noted a marked seasonal variation of chicken-pox and a more regular monthly incidence of herpes zoster. Chicken-pox occurred most frequently in children under 10 years of age while herpes zoster was more prevalent among adults. They concluded that these facts were arguments against a close relation between the 2 diseases. They also tried the effect of neutralization of chicken-pox virus with serum from a patient who had recently recovered from an attack of herpes zoster (J Exper Med 49 907 (June) 1929). The chicken-pox virus, collected from fresh chicken-pox vesicles and injected into the testes of certain species of monkeys, produced typical nuclear inclusion bodies in the testicular cells. When convalescent herpes zoster serum was mixed with the chicken-pox virus, in 2 out of 3 instances these nuclear changes occurred as usual, but in 2 other instances, convalescent chicken-pox serum neutralized the action of the virus and no intranuclear bodies were produced. The study led the authors to believe that the viruses of the 2 diseases were probably not identical.

**EPIDEMIOLOGY** — N. G. Hill (Brit J Child Dis 26 193 (July-Sept) 1929) reviewed the epidemics of chicken-pox and herpes zoster that invaded an institution of 800 children during the years 1926 to 1928. Herpes and chicken-pox occurred together in 10 of the outbreaks. In 9 instances herpes zoster in 1 patient was followed by chicken-pox in others who were exposed. In 1 epidemic a patient developed herpes following an exposure to chicken-pox.

**PERIOD OF INFECTIVITY OF CHICKEN-POX** — J. F. Gordon and F. M. Meader (J A M A 93 2013 (Dec 28) 1929) have observed 2 instances which demonstrated the infectious period of chicken-pox. A group of susceptible children were exposed to a patient during his incubation period except for the 24 hours immediately before the outbreak of the rash. The exposed group did not contract the disease. In another instance, a girl was exposed to a patient in the incubation period of chicken-pox except for the 9 hours immediately preceding the eruption. She did contract the disease. The writers concluded that chicken-pox is probably not infectious for more than 24 hours before the eruption appears. The authors were able to record accurately the length of the incubation period of 67 chicken-pox cases which developed as a cross-infection in an institution. The time was 13 to 16 days in the majority of instances and there were none as long as 21 days and only 2 as short as 11 days. In regard to protective powers of chicken-pox convalescent serum, they concluded from their observations that if the serum was collected from a patient within a month after recovery from the disease, it was highly potent but when collected later, the power decreased. If taken from the patient as late as 5 months after illness, the serum conferred protection to only a third of the exposed persons injected.

**IMMUNIZATION.** — **Vaccination** against chicken-pox has proved valuable in institutions to check the spread of the disease, according to some investigators. Many of them, however, do not advise the vaccina-

tion of persons who have not been exposed to the disease because of the possibility of producing it by the procedure. This is the opinion of L. O. Finkelstein, R. A. Wilfand and E. N. Choccol (*Monatschr. f. Kinderh.* 40:489, 1928) who vaccinated 43 infants with material taken from fresh chicken-pox vesicles. A single vesicle produced at the site of the scratch or intradermal injection, or a mild generalized eruption on the body conferred immunity.

F. Benini (*Riv. di clin. pediat.* 26:824 (Nov.) 1928) employed the scarification method of vaccination against chicken-pox in 27 patients and the intradermal injection method in 13. Much better results were secured by the latter method.

Instead of vaccinating with the lymph from chicken-pox vesicles, Kálmán von Késmárszky (*Arch. f. Kinderh.* 85:1 (Aug. 31) 1928) claimed he produced immunity by intracutaneous injections of 0.1 cc (16 minims) of citrated blood taken from a patient during the first 36 hours of the disease. There were no marked local or generalized reactions. Other investigators have found this method valueless.

**VARIOLA.** See SMALLPOX.

**VEINS, VARICOSE.** See VARICOSE VEINS.

**VERRUCAE — TREATMENT**  
—Dietel (*Deut. med. Wchnschr.* 54:2101 (Dec. 14) 1928) reports results of treatment with milk injections of 24 patients suffering from flat warts. He sterilizes fresh cows' milk by boiling and injects 1 cc (16 minims) intradermally, bi-weekly. Two to 4 intradermal punctures are made each time. He states from 2 to 20 series

of 4 punctures are necessary to cause complete disappearance of the warts.

Hazen (*Am. J. Roentgenol.* 19:440 (May) 1928) reports 157 cases of plantar warts treated by radium and x-ray, with good results. The condition is more common in women than in men, in ratio of 2 to 1.

Acuminate warts or the so-called "*venereal warts*" are successfully treated, according to Howard Fox (*Am. J. Surg.* 6:418 (Apr.) 1929) either by cautery or electro-desiccation. Larger lesions should be excised. Local applications are unsatisfactory.

Senile warts are found by Fox (*ibid.*) to be most easily removed by a sharp curette followed by application of silver nitrate stick. X-rays, radium or electro-desiccation are also curative measures.

**VERTIGO.**—Vertigo, or dizziness, is a disturbance of equilibrium because of a false feeling of movement, and may have any degree of intensity, varying from a mild sensation of objects moving round and round, causing very little subjective distress, to attacks of epileptiform nature producing at times almost the condition of unconsciousness. Perfect equilibrium is a cerebral function and when there is a lack of perfect function between the various sensations which the cerebrum obtains through the several sense organs, for example, the muscle sense of the labyrinth, various degrees of vertigo are experienced. Compensation for vertigo may occur under certain conditions. The cerebrum has the ability to overcome effects of the confused static and kinetic information, and when this is thoroughly accomplished, no sensa-

tion of dizziness may occur or the person may be conscious of a mild feeling of turning round, yet may be able to compensate in such a manner that it causes no discomfort

Vertigo is said to be a pathologic impression rather than a physiologic reaction. This is believed to be true because of the very complexity of the impressions which are received, since it is unlikely that special tracts for vertigo alone exist within the central nervous system, such as exists for the sensation of sight, the sensation of hearing, etc. M. A. Liskoff (South M. J. 21 312 (Apr.) 1928) believes that the vestibular nucleus may be influenced (1) by the labyrinth, (2) by the cerebellum, (3) the cerebral cortex, (4) trigeminus, and (5) by innervation of the neck muscles. Stimulation or irritation of the internal ear will cause definite sensations of vertigo. Some connection must exist between these factors mentioned and the cerebral cortex in such an arrangement that the sensation of vertigo may be noted.

I. Muller (Proc. Roy. Soc. Med. (Sect. Otol.) 21 47 (June) 1928) states that vertigo is a subjective sensation of uneasiness due to the apparent staggering or rotation of adjacent and approximate objects, or motion of the ground and the sensation of falling. He feels that there are 2 different types of vertigo: (1) The vertigo of touch and (2) the vertigo of sight.

According to Muller, the organ of equilibrium is the so-called static organ or "sixth sense." This "sixth sense" is a particular arrangement within the body to receive sufficient external and internal impulses and transfer them to certain nerves

Muller, in a philosophical mood, thinks that certain fundamental concepts of time and space have to be taken into consideration. He remarks that the idea of space is the result psychologically of complex views of the position, form, size and state of motion of the objects and things around us.

According to the mode of perception, 2 kinds of space exist. (1) The space perceived by touch or tactile sensation and (2) the space perceived by sight or sight sensation. "Tonus" represents a mild but permanent tension and contractibility of the muscles which exists normally and independently of voluntary control, while co-ordination is the result of a harmonious interaction of muscle groups.

The ear is an anatomical, psychological, and physiological organ, functioning simultaneously, and making up an efficient mechanism for body protection. Vertigo may be looked upon from 3 different viewpoints: (1) The physiological, (2) the pathological, and (3) the experimental. Physiologically dizziness may be the result of experimental vertigo and may be due to diagnostic procedures and found only with, or in consequence of, movement. Physiological vertigo is primarily a protecting reaction. Pathological vertigo is a danger sign. Dizziness and nystagmus, while generally regarded as of aural origin, are in reality the result of a lesion or disturbance in any part of the vestibular tract between the semicircular canals and the central origin within the brain substance. The equilibratory disturbances of tabes dorsalis are due to ataxia.

Pathological vertigo may be divided into the following subdivisions: (1)

In consequence of acute otitis, (2) from neuritis of the vestibular nerve, (3) Ménière's disease, (4) following rapid motion of the head, (5) from peculiar positions of the head, (6) in cases with Alexander-Hennebert symptoms, (7) ocular, (8) cerebral, (9) drug intoxication, (10) vasomotor, (11) neurotic, (12) endocrine, (13) hysteria, (14)luetetic

*Labyrinth* or *spontaneous vertigo* is ordinarily due to turning, in which the patient feels that objects swirl around him and always in a horizontal plane. Occasionally, however, combined with nystagmus, the latter condition may not exist. The patient states that he is dizzy. There is a clinical rule that turning of physical objects in the direction of the nystagmus and of the patient with a slow component exists. The patient feels as though something within his head or brain were turning. This type of vertigo is often noted in cerebellar tumors of blind individuals.

*Tactile vertigo* is not so well known. Errors of sensation, as for example, the bed turning over or the ceiling of the room falling, are complained of. When the patient stands up, he feels uncertain for a time, but soon recovers his equilibrium. If attempting to sit down on a chair, he has the impression that one side of the chair has fallen. These ordinarily have been regarded as cases of hysteria, but in truth are not, since they are accompanied by a true otitis and the vertigo disappears when the acute otitis is cleared up. Galvanic tests can be used to advantage in studying these cases.

**VINCENT'S ANGINA.**—This is an affection of the oral and pharyn-

geal mucosa caused by Vincent's spirochæte, frequently in association with the fusiform bacillus. The condition occurs usually in individuals who have little or no oral hygiene and who are very much below par and constitutionally run down. The 2 bacteria mentioned act in symbiosis.

V. Jelinek (*Acta oto-laryng* 11 533, 1927) is of the opinion that the spirochæte is the etiological agent and produces the inflammatory reaction, whereas the fusiform bacillus is merely a parasite. Parasites, according to Jelinek, only continue and do not originate the ulcerative process. During the World War, in certain regions, Vincent's infection assumed an epidemic character. More recently, at an eastern girls' college in the United States among a group of 462 students, 139 were found by K. Pardee, F. F. Gordon and C. V. Riley (*New England J. Med.* 198 796 (May 31) 1928) to have the Vincent's organism in the mouth or throat. In the majority of the cases where infection occurred, the condition cleared up in about a week, following the daily application of chromic acid and the use of a mouth wash. Tobacco smoking had no influence one way or the other on the incidence of the disease. All degrees of severity may be found clinically. In mild cases, possibly an occasional patch on the posterior or postero-lateral pharyngeal or tonsillar region may be noted. From this mild type, gradations of every severity may occur until we note the most severe and advanced cases in which foul ulcerative lesions involve the entire mouth, nose and throat and occasionally the larynx.

D. P. Seecof (*Arch. Otol.* 10 384 (Oct) 1929) reports a case of death

which occurred 4 days after the onset of symptoms of orbital and meningeal complications due to the extension of infection from the accessory nasal sinuses. Necropsy revealed chronic infection of the frontal, ethmoid and sphenoid sinuses. There was an advanced osteomyelitis of the frontal bone with cellulitis of the left orbit, a localized meningitis and also pulmonary gangrene. From each of these regions the typical Vincent's organisms were obtained. Mixed infections were also present. The lesions intracranially seem to have resulted from the spreading of the infection from the sinuses through the frontal bone, and finally the pulmonary lesions were the result of aspiration.

**PATHOLOGY.**—Vincent's angina is a disease characterized by a membranous exudate on some region of the oral or pharyngeal mucosa. When removed there appears a raw, nasty, bleeding ulcerated surface, a characteristic foul odor from the mouth with abundant salivation and some pain is noted.

**TREATMENT.**—The treatment may be divided into 2 parts (1) Local, (2) systemic. **Neoarsphenamin** in glycerin has been used with success on the lesions locally. **Sodium perborate** appears to be useful in selected cases. Some authorities remove the membranous exudate and treat the ulcerous area with **tincture of iodine** or **silver nitrate**, 2 per cent solution. A mixture of equal parts of **acriflavine** with **gentian violet** is useful at times. The general treatment for this affection is that of general body sustenance, with a **sufficient diet**, and in cases where a dietary deficiency appears to have been

one of the important factors in the etiology, it is of extreme importance that this be corrected. Large quantities of **fluids** are advisable, and the bowels should be kept open with **salines** or **oil**. The **arsenicals** have been prescribed for many years as useful in treating this disease. Recently O. G. Rigby (Tri-State M. J. 1:47, 1928) used **bismuth** with some success. This may be used locally as well as systemically.

## VIOSTEROL. See I. RIPOSTEROL

**VISION.—PHYSIOLOGY.**—F. H. Adler (Arch. Ophth. 57:346 (July) 1928), in a comparative study of the role of pigment in the physiology of vision, finds some form of pigment is present in the eyes of most vertebrates and invertebrates and each of the various types of pigment occurring in the mammalian eye shows analogies in structure and function to the various pigments found elsewhere in the animal kingdom. The fully developed eye has the functions of light-protection, isolation, absorption, photodynamic sensitization, and phototactic movements. The pigment cell is an essential component of every photo-receptor.

F. W. Weymouth (Am. J. Ophth. 11:947 (Dec.) 1928) reports an investigation of the visual acuity of a central retinal region (including the fovea) with a radius of 85' or 0.42 mm. from the axis of fixation. The method of observation yielded significant results to 3 observers. These are summarized as follows. In the light-adapted eye a uniform sensory gradient is shown to exist in the central retinal area similar to that found in the entire retina (Wertheim, Aubert,

Fick and others) The visual acuity attains a sharp maximum at the axis of fixation. It decreases rapidly, but regularly, in all directions. It shows no breaks or marked variations in rate of change at the margins of any of the known anatomical areas (fovea, rod-free area, pigmented area or macula, non-vascular area)

**SIGHT-SAVING CLASSES** —In E V L Brown's (Am J. Ophth 11 118 (Feb ) 1928) opinion, children with a visual handicap should not be segregated from those with normal vision unless their corrected vision is less than 20/60 to 20/70. Children with poor vision should be supplied with textbooks having large type, they require also more light, more room, and more attention from the teacher than those with normal vision.

He concludes that no detriment to the eyes has resulted from the sight-saving class work and that nearly all of the children in the sight-saving classes can maintain their place in school and be promoted.

G A Kempf, B L Jarman and S D Collins (Pub Health Rep 43 1713 (July 6) 1928) review the anatomy of the eye, the physiology of vision, the principles of optics and give a detailed study of the eyes in 1860 children in the Washington public schools. Special points in the general discussion are the rapid development of myopia between the seventh and twelfth year and the importance of examinations by specialists. The following are the important features brought out by this survey: (1) The simple Snellen test reveals but a small percentage of the actual number of refractive errors in children, (2) the myopic eye is nearly always discovered with the use of the simple

Snellen test, (3) the hyperopic eye is rarely found with the simple Snellen test, and then only the very severe types are revealed, (4) the astigmatic eye may be found with the simple Snellen test. Of course the simple Snellen test does not reveal the type of visual defects, it shows only that certain eyes can read only certain letters at a specified distance, (5) the frequency of myopia tends to increase between the seventh and twelfth years. This is very important, as myopia may develop rapidly. For this reason all school children should have the simple Snellen test twice a year, (6) of the 66 per cent of eyes which read 20/20 or better and appeared normal, 32 per cent read 20/50 or worse when a cycloplegic was used, thus indicating that many eyes work under a handicap. Nearly one-fifth of all the children tested 20/100 or worse after the cycloplegic, (7) the hyperopic eye tends to improve with advancing school age, (8) the myopic eye tends to grow worse with advancing school age, (9) the results emphasize the necessity for regular annual examination of eyes which are known to be defective.

**VITAMINS** —The dietary accessory factors essential for health, growth and reproduction are today recognized as 6 in number. Vitamin A is essential for growth and protection against respiratory infections, B is the anti-neuritic, anti-beriberi essential, C protects against scorbutus, D is a bulwark against rickets, E is said to be necessary for reproduction, and G plays its rôle against pellagra. It is something of a memory task to recollect from a letter of the alphabet what rôle any vitamin

plays in physiological economy Jones suggests that the name should signify the function, thus vitamin B might well be called *rachitamin*, vitamin A *ophthalmamin*, and so on In this way, complexity arising from discovery of more than one agent under a single letter as has taken place in the case of B is done away with For instance, B has been separated into a more heat-labile fraction which is the anti-neuritic element, and a more heat-stable, water soluble factor called the P-P or pellagra-preventive factor This also has to do with growth and maintenance Who can remember easily what B<sub>1</sub> and B<sub>2</sub> signify?

It is of interest to consider seriatim these alphabetical dietary constituents in relation to recent findings L H Jorstad and C G Johnston (Am J Pathol 3 489 (Sept) 1927) found that when various lipid solvents such as ether, mineral and vegetable oils and chloroform are injected, the reaction of the host is conditioned by the vitamin A content of the diet When this is deficient, the lipid solvent remains as injected, while when the diet is rich in vitamin A the solvent is dispersed into small droplets This shows the stimulating action of vitamin A on cellular activity When certain lipid solvents are given to rats along with a diet rich in vitamin A, massive fatty infiltration of the liver occurs after longer or shorter periods according to the solvent used

Vitamin A deficiency has a specific effect in epithelial structures, according to S B Wolbach and P R Howe (Arch Path and Lab Med 5 239 (Feb) 1928) Normal epithelium in the respiratory tract, alimentary tract, eyes, parotid glands and genito-

urinary tract is substituted by stratified keratinizing epithelium The growth of this replacing tissue is rapid and continuous and not responsive to the balancing or regulatory factors which govern normal covering epithelium

E Mellanby and H N Green (Brit M J 1 984 (June 1) 1929) observed that when animals are deprived of vitamin A, they ultimately die with multiple foci of infection, whereas controls receiving vitamin A remain healthy If infected animals were given the lacking dietary constituent early enough recovery obtained On the basis of this, the influence of vitamin A on puerperal septicemia was tried In the 5 cases receiving the substance, there was no death, while 22 out of 24 cases not given the vitamin died It appears that the effect is rather to increase the general resistance gradually than to act as a specific bactericide or antitoxin *Streptococcus hemolyticus* was recovered from the blood of the 5 cases which were treated. It is not believed, however, that the anti-infective action of vitamin A is specific in puerperal septicemia, but that this is general for many other types of infection In times of special stress such as pregnancy, an adequate supply should be given in the form of natural food, such as egg-yolk, green vegetables, milk, butter and cheese Fat-soluble vitamin A is found in human milk in high concentration under healthy conditions, but may be inadequate under others Of practical significance is the fact that vitamin A is found associated with the yellow pigment, carotin, which gives to yellow corn, egg yolk, etc, its characteristic color Abundance of

vitamin A seems to raise resistance to common colds. Its deficiency may result in disturbance of calcium metabolism resulting in bladder stones and calcification of kidney tubules.

W B Rose, C J Stucky and G R Cowgill (Am J Med Sci 177 307 (Feb) 1929) have found that there is a distinct decrease in the motor power of the stomach in vitamin B deficiency. An atonicity usually precedes the neuromuscular symptoms. The data seem to indicate a relation between this phenomenon and a variable increase in blood concentration. B R Hoobler (J A M A 91 307 (Aug 4) 1928) considers from his own studies and those reported in the literature that vitamin B deficiency in infants is evidenced by the following symptoms: anorexia, loss of weight, spasticity of extremities, rigidity of the neck, restlessness and fretfulness. Pallor and a low hemoglobin are often present. This deficiency may occur in breast-fed infants when the mother's diet is vitamin deficient. The symptoms may be made to disappear on the addition of *brewer's yeast* concentrated to the diet.

Not much of recent importance has been added to the literature on the antiscorbutic vitamin C save what is recorded under Deficiency Diseases in this SUPPLEMENT, which should be consulted.

With regard to vitamin D, the most practical point is the official designation of the potent product, irradiated ergosterol, as "*Viosterol*" by the Council on Pharmacy and Chemistry of the American Medical Association. Products marketed under any other name do not receive Council approval. Since investigation has shown that

the exposure of vitamin D to heat and air results in a loss of potency, it is obvious that very careful control must be had in the artificial preparation of this dietary necessity. It has been found that vitamin D can originate in the process of barley germination and the development of the anti-rachitic substance does not depend upon light. This, however, is not to be taken as minimizing the importance of irradiation in the production of an active ergosterol preparation.

K Blunt and R Cowan (J A M A 93 1141 (Oct 12) 1929) report that slight deficiencies in vitamin D in healthy adults produce no apparent harmful results but that the case is different under abnormal or unusual conditions where the body has special need for calcium, such as in pregnancy, osteomalacia, parathyroid deficiency and the like. Short time withdrawal of the vitamin or its addition in moderate amount has no determinable effect on the metabolism of calcium and phosphorus. On the other hand, the addition of large amounts is beginning to be recognized as potentially, if not actually, harmful. Metabolism, especially of calcium, is accelerated. In certain species of animals, calcium is deposited in quantity at sites predisposed to such deposit according to H Kreitmair and T Moll (Munchen med Wchnschr 75 637 (Apr 13), 1113 (June 29) 1928).

The distribution of vitamin D is limited, so the finding of any new source available for food is worthy of note. M C Kik and E V McCollum (Am J Hyg 8 671 (Sept) 1928) record that herring and haddock oils are rich in this element. Herring



being the fatter fish is the richer. It is fortunate that herring is also the more abundant.

With respect to the E vitamin, all the work has been done on animals. Until its utility for man has been proven, any analysis is superfluous. Finally, note may be made of the reported fact that the ethylene ripening of fruits now coming into practical use appears to have no significant destructive effect on the vitamin contained therein.

**VITILIGO.**—Vitiligo, according to A. C. Roxburgh (Brit J Dermat 41: 351 (Oct) 1929), occurs in isolated patches the distribution of which cannot be brought into line with that of any system of nerves or blood-vessels, also it may have a wide distribution involving the whole body. Studies were made on the effect of heavy stroking, the histamine reaction and the epinephrine reaction of the skin in normal and affected areas. The author states that his observations reveal no striking or constant difference in the response of the superficial blood-vessels to stimulus in skin affected by vitiligo, as compared with normal skin.

**TREATMENT.**—M. A. Quiyum, (Indian M Gaz 63: 582 (Oct) 1928) reports having successfully treated a case of vitiligo diffusa with **sodium cacodylate**, hypodermatically.

**VITREOUS.**—J. Meller (Arch Ophth 57: 134 (Mar) 1928) reviews the theories of Fuchs and Lauber regarding the absorption and disappearance of vitreous hemorrhages. Fuchs believes that a solution of the extravasated blood leaves by way of the usual excretory channels, while Lauber is of the opinion that, since dissolved

hemoglobin is found diffused in the vitreous and since the blood corpuscles undergo other changes, clinical experience teaches that vitreous hemorrhages, even when copious, will become absorbed in time, especially in young and otherwise healthy eyes. In cases of repeated hemorrhages in the presence of chronic inflammation the power of absorption is lost and organization of the effusion takes place.

He shows that the non-pigmented cells of the epithelium of the flat part of the ciliary body are able to absorb, digest, and carry away decomposed masses of blood. In 2 eyes which were sectioned, the non-pigmented cells were found to be permeated with a yellowish-red substance apparently containing broken-down erythrocytes. Derangement of the function of absorption probably accounts for the condition of so-called *vitreous glaucoma*.

**VOLKMANN'S CONTRACTURE.**—The dynamic pathology of ischemic paralysis has not yet been established, but there is a growing opinion among students of this condition that it is primarily vascular and secondarily muscular. The venous stasis, from whatever cause, results in an engorgement of the muscle bundles, which subsequently split under pressure. P. Lucene (Paris med (Nov 3) 1928) reported a case which was successfully managed by **aponeurotomy**, the hand being immediately released on clearing out the sanguineous infiltration. While Volkmann's contracture is often associated with tightly applied dressings, it is questionable whether or not this alone is adequate. Possibly it is the fracture itself rather than the dress-

ing that is the responsible agency. Vascular injury appears to be an essential factor, but not a sufficient one, occlusion of a vessel would cause gangrene rather than contracture. It is notable that ischemic palsy is commoner in children than in adults, due probably to the superior health of the vascular apparatus in the young. The same lesion in an adult would produce gangrene. Among the early symptoms of Volkmann's contracture, Lewis (Amer. Journ Surg (May) 1929), emphasizes induration in the antecubital fossa, ecchymosis, tense, shiny skin, and fever due to absorption of muscle waste products. Lewis believes that this condition may be differentiated

by observing in true Volkmann's contracture that the hand has to be flexed before the fingers can be passively or voluntarily extended. The subsequent symptoms, pain, swelling, vesiculation, cyanosis, contraction of the flexors, and eventual atrophy, are well known.

**TREATMENT** consists of physiotherapy, massage, and the application of straight finger splints. Passive movement should be introduced. In severe cases, operations, such as that of Lecène above described, are indicated. Lewis (*ibid*) suggests that in supracondylar fractures with injury to the soft parts, acute flexion at the elbow should not be forced, and casts should be avoided.

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## W

**WASSERMANN TEST**—In spite of the fact that the mechanism of the Wassermann test is unknown, it continues a diagnostic means of first importance. As one teacher states there are mixed "patient's serum in which a search is made for syphilitic 'antibody' about which nothing is known, guinea pig serum containing 'complement,' also a chemical unknown, antigen made, not from spirochetes or even spirochete-containing tissue, but from the heart of a steer who never had syphilis, sheep cell amboceptor, a powerful something or other, sheep cells and normal saline solution. Something unknown happens in this mixture and yet it is a valuable test. Naturally, the end of this is a plea for more chemical and physical knowledge of the substances and the reaction. But awaiting this, it is nevertheless 90

per cent correct in good hands." This latter point is worthy of accent, for experience is a very important factor in the actual technic of the test. As T. E. Osmond (Lancet, 2 624 (Sept 21) 1929) remarks choose a sound technic, a reliable serologist and a good laboratory. Especially important for comparative results, to follow the course of treatment is the use of one good technic of the many which are advocated.

On account of the fact that a positive diagnosis of syphilis apart from its medical significance, is often also of social and medico-legal importance, it is necessary to use caution in branding a person syphilitic merely on the strength of a positive Wassermann reaction. Actually, most clinicians and laboratory men refuse to do this in the absence of clinical symptoms and history. From the

technical point of view, every new antigen is titrated before it is used, old and previously reliable antigens also occasionally "go bad." Now in adjusting the dose of an antigen used in the reaction, known positive and negative sera are employed. A good antigen is one which is strongly positive when syphilis is present, negative when it is absent, and has a good margin between these doses and anticomplementary action. There is often a choice between using an amount of antigen which will always accent the presence of syphilis and give, perhaps, a few false positives and one which will never give a false positive but will fail occasionally to "pick up" a mild syphilis. Most authors favor losing a few positive diagnoses of mild or latent syphilis and being certain of their negatives.

*Wassermann-fast syphilis* is always a very important problem. When does a syphilitic become Wassermann-fast is answered in somewhat different detail. L. W. Lord (South M. J. 21 636 (Aug.) 1928) adopts as his criterion, 1 year of regular and active treatment with persistently positive reports. One or 2 dissenting voices are heard from the general opinion that Wassermann-fast syphilis is a grave disease. The dissenters point out among other things that it is not always the patient whose Wassermann quickly becomes negative who does the best, nerve and heart syphilis is commonplace with negative tests. However, it is wisest to keep both the serological and clinical aspects in view. John H. Stokes (Mod. Clin. Syphilology, 370, 1926.)

In discussions of the test done during pregnancy and on the child immediately after birth, there is always an

out-cropping of doubt as to whether these periods of life interfere with its accuracy. J. L. Lane (Northwest Med. 27 77 (Feb.) 1928) believes it is reliable in the first 4 months of pregnancy, but that one should have other good evidence in the last months. Probably it is not so reliable in infants less than 2 months old, although P. Trillat and J. Rousset (Gynec. et Obst. 17 264 (Apr. 1928)) believe that blood obtained from the umbilical cord at birth yields excellent information.

For comparisons with the Kahn test, see under KAHN TEST.

**WATER THERAPY.**—R. H. Ruhmkorff (Am. Med. 35 443 (June) 1929) gives the following summary of the general effects on the body which are to be expected from hydrotherapeutic procedures. *Heat* will raise the body temperature and metabolic rate, causing an increased oxidation and excretion of carbon dioxide. The blood is rendered more resistant to infection by increasing the opsonins and activating leukocytosis. Brief applications of intense heat cause contraction of the smooth muscle fibers of the skin, but the prolonged application excites the sweat glands and perspiration is greatly increased. The brief applications cause a reflex excitement of the nerve centers, exhaustion follows if they are prolonged. Both types of muscles, voluntary and involuntary, can be made to increase their tone or decrease it, by the application of water at various temperatures. *Cold* reflexly increases metabolism by stimulation of the autonomic nervous system. It will induce a varying degree of leukocytosis and increases erythrocytosis, while warm fomentations cause a local increase in leukocytosis but a decrease in erythrocytes, cardiac beats are quickened at first but later slowed and strengthened by cold, heat has a reverse action. The peripheral circulation undergoes a vasoconstriction and dilatation, this also affecting the tonicity of the heart. The internal viscera are relaxed by warmth because of

a decrease in intra-abdominal pressure Cold acts oppositely

The more simple methods of hydrotherapy are as follows (1) The *full bath*, indicated mostly when treatment is needed as a stimulant or depressant

(2) *Mineral baths*

(3) The *half bath* or set-up allows the patient to be partly in water and requires an attendant to douche the shoulders and spine Massage and friction aid this type of treatment which can be beneficial in **hyperpyrexia**, **psychoses**, **gastro-intestinal disturbances**, etc

(4) The *sitz bath*, which consists of a special type of tub arranged to accommodate the pelvic girdle and is very useful in **sciatica**, pelvic and rectal disorders

(5) *Foot baths* and *arm baths* exert a powerful influence on local pathology as well as drawing circulation from the brain and lungs

(6) *Whirlpool baths* are beneficial on joint pathology

(7) *Douches* act as stimulants on general or local pathology

(8) *Sponging* is a common procedure used for **hyperpyrexia**, **neuritis**, etc

(9) The *drifting sheet* is often used for a general reaction the patient standing and being wrapped by the attendant in either a warm or cold sheet The patient receives a good general stimulative effect from this procedure

(10) *Fomentations* and *compresses*

(11) *Turkish baths* and *steam cabinet* baths are often useful in opening the pores of the body and promoting diaphoresis

H G Mehrtens and P S Pouppirt (Arch Neurol and Psychiat 22 700 (Oct) 1929) in a study of the effects of fever produced by baths, state that hyperpyrexia induced by hot baths is under perfect control It can be maintained at any degree or for any length of time up to 2 hours and may be applied on alternate days or even on every third day if necessary Baths may be continued daily for at least 6 weeks and the patient may still gain in weight and maintain his strength They may be applied along with antisiphilitic therapy, it is even probable that the hyperpyrexia tends to intensify the therapeutic effect of the antisiphilitic medication **Neurosyphilis** seems to offer the most favorable field for

treatment by *hyperpyrexia* The results compare well with those obtained by malaria therapy Frequent amelioration of individual symptoms was obtained in **Parkinson's syndrome following encephalitis** as well as in **combined sclerosis** Pain resulting from minor disturbances in muscle, nerve and joints proved especially amenable to treatment by heat No results were obtained in amyotrophic lateral sclerosis

**WHOOPING COUGH.** See PERTUSSIS

**WRITER'S CRAMP.**—This is the commonest of the occupation neuroses, constituting about a third of that group Onset is usually, though not always, gradual Awkwardness with a sense of aching or fatigue comprise the early symptoms, and stiffness and difficulty in writing progress rapidly until the script is almost illegible The motor symptoms are most commonly of a spastic nature, although in some cases tremors or weakness are the dominant motor phenomena In the typical form, grasping a pen or pencil results in a spasm of the flexors, the instrument is held awkwardly, often digging into the palm When the pencil is released, complete relaxation of the involved musculature occurs Most neurologists believe that this is a purely functional condition, although the possibility of peripheral nerve pressure cannot be entirely dismissed The cramp is usually classified as an exhaustion neurosis Since each of the involved muscles may be used for some purpose other than writing, the central pathology, if any, must concern the coordinating centers

The condition is a stubborn one and often resists treatment Rest is the most important therapeutic indi-

cation, if the patient's work does not require much writing, he should be warned to avoid using a pen or pencil at home, and this abstinence if faithfully carried out, will usually bring about some relief. If writing is an essential part of the patient's work, he should be encouraged to use a typewriter, or if this is not available, he should try to learn to write with

his other hand. **Massage and electricity**, applied locally to the affected hand are advisable therapeutic measures, their value being largely psychic. Juster (Paris med 18 545 (June 9) 1928) has recently suggested that writer's cramp is a form of decerebrate spasm, comparable to chorea. Most neurologists, however, continue to classify it as an occupation neurosis.

## X

**XANTHINE BASES.**—Apparently no relation exists between the xanthine bases and body weight, from which it is to be concluded there is no relation between these nuclear by-products and basal metabolism. On the other hand, factors affecting carbohydrate metabolism have an indirect effect on the purines, for it is reported that in dogs the subcutaneous injection of adrenalin causes a definitely increased output of uric acid and allantoin, while the total nitrogen is not affected as a rule. Apparently the adrenalin leukocytosis is not a factor in this phenomenon. Allantoin excretion is not enhanced when the splanchnics are cut and adrenalin exhibited.

Recent work on muscle purines by J. K. Parnas (Klin Wchnschr 7 2011 (Oct 14) 1928) shows that in resting muscle the predominant base is adenin, probably adenin nucleotide. When muscle changes so that ammonia is produced, this substance converts adenin into hypoxanthin, and adenin nucleotide is converted into inosinic acid. When the muscle is injured by mechanical means this change takes place instantly. It occurs slowly in stored muscle. Some

95 per cent of the adenin or hypoxanthin in muscle is present as nucleotide. The suggestion is made that the ammonia formed during muscular activity is derived from the adenin by deamination.

The diuretic effect of the purine derivative caffeine, has long been known. W. Wohlenburg (Arch f d ges Physiol 218 448, 1927) has studied other purine compounds from this point of view, using the frog kidney as experimental material. He found that theophylline as well as caffeine causes a marked diuresis which is reversed by high concentrations. Low concentrations exert their action on the glomeruli rather than on the tubules. While narcosis and asphyxia act as retardants of the diuresis, they may be overcome by the use of higher concentrations.

**XANTHOMA.**—U. J. Wile, H. C. Eckstein and A. C. Curtis (Arch Dermatol and Syph 19 35 (Jan) 1929) have demonstrated in 3 cases of typical xanthoma that identical cholesterol values in the local lesions exist for all 3 and that the cholesterol is not increased in the tumors over the amount that is found in nor-

mal human epithelium In 2 of the 3 cases, the cholesterol values in the blood were normal on repeated examination The best *treatment* for the xanthomatous state in the presence or absence of glycosuria is a reduction of diet.

R. S Rowland (Arch Int Med 42 611 (Nov) 1928) reviews 14 cases which represent a form of generalized visceral xanthomatosis in which many parts of the reticulo-endothelial system showed lipid storage or lipid cell hyperplasia This occurs in interstitial cells as a diffuse process, in lungs, liver, lymph nodes, bone marrow and spleen, as well as in hyperplastic nodules arising from areolar tissue, particularly that of dura, periosteum, pleura and peritoneum It is regarded as a disturbance of lipid metabolism

### X-RAY AND RADIUM THERAPY—ADVANCES

—The Radiological Committee of the League of Nations was formed in 1918 to advance the science of radiology and particularly to find ways of advancing and perpetuating newer developments in the application of radium and x-rays in the treatment of cancer This committee was essentially an outgrowth of the Cancer Committee organized under the Division of Hygiene of the League of Nations Meetings have already been held in Stockholm, London, Paris and Munich The working programme of the committee can be summed up as follows (Regaud's plan) (1) Public and scientific propaganda for early diagnosis of cancer and thus an early and prompt application of radiation (2) Working out of plans for scientific application of radium It is interesting to note in this respect a comparison of the figures of five-year cures in **carcinomas of the cervix** in the Radium Institute of Stockholm, London, Paris and Munich, where, as is well known, direct methods of procedure were used and still practically identical results were obtained, thus indicating that a systematic and a rigidly con-

trolled scientific application of radiation is of paramount importance (3) Advice to different clinics and institutes as regards equipment and the supplies necessary for adequate radiation therapy The Radium Institute of Paris is provided with 7 grams of radium element, 4 grams of which are used for external applications, 1 gram for the production of radon, and 2 grams in the form of local applications Radium hemmet in Stockholm possesses 25 grams of radium element, which recently was increased, by a private donation, to 6 grams and on the occasion of the seventieth birthday of the King of Sweden, to 12 grams The Radium Institute of Munich is supplied with 500 mg (4) International standardization of all statistical publications, this applying especially to the description of dosages, as well as to the classification of the different diseases (5) The placing of certain scientific investigations on a common international basis The first report of the committee (prepared by Heyman, Lacassagne and Voltz), which has already been published, deals with the grouping of cases, the standardization of statistics and normalization of the doses In a later report, the criteria and conditions of the systematic radiation therapy, as well as a critical survey of the methods used at the institutes of Paris, Stockholm and Munich and the recently completed noteworthy statistics of Lane-Clayton, of London, will be given It is hoped that by this intimate cooperation a clearer understanding of irradiation conditions will be brought about

**ACTION OF X-RAYS**—Action of x-rays on living tissues is not effected so long as it is in motion Only at the point at which its progress is arrested are electrical and physical effects brought about At this point of arrest, the rays liberate negative electrons (cathode particles) which tend to suspend the activity of the positively charged particles which lie in the immediate vicinity A P Evans (Arch Physical Therapy 10 158 (Apr) 1929) believes that both the therapeutic and the destructive action of the x-rays on living tissue are due to their capacity to liberate cathode particles at the point at which their progress is stopped It seems obvious that to prevent or minimize the destructive ef-

fects of the x-rays in living tissue, some means must be had of restricting the activity of these released negative electrons, or of overcoming or neutralizing the negative charge they carry. He has obtained this result by using Guilleminot's oscillating circuit. The circuit used by Evans is essentially the early wireless sending set, with a large capacity transformer, and a large condenser, in place of the induction coil and small condenser. The addition of these units gives the circuit the capacity to cause tissue effects of great magnitude.

**ACTION OF X-RAYS AND RADIUM**—Hypotheses, explaining the fundamental biological action of x-rays and radium are very numerous. Many reports of varied experiments need confirmation but deserve further investigations, not only because of their scientific interest, but because of the great importance that such information bears to the unravelling of many effects which these radiations have on tissues. F. Dessauer (Radiology 14:1 (Jan.) 1930) discusses certain phases of biological reactions of radiation in a most thorough and convincing manner. He holds that the absorbed energy of radiation producing strong biological effects is very small and amounts to a few calories only. From this fact it can be concluded that the energy cannot act as a uniform increase of temperature throughout the biological medium, but must, instead, *produce heat at discrete, very small points*. In this case the local amount of energy can be large, however small it is on the whole. The other biological reactions follow this fundamental effect. This idea of the action of rays at discrete points is supported by the experimental fact of physics that the action is caused by the impact of electrons. Part of the absorbed energy of the x-rays, gamma rays, or ultra-violet rays reappears as kinetic energy of photo and scattered electrons, which lose velocity on their path through matter, this loss of energy occurs at *discrete points*. Dessauer submits a third idea of the hypothesis, to the effect that large molecules, especially protein molecules, are important in the biological subject. If a protein molecule receives one or several such impacts, it will react. This reaction may be either specific or non-specific. A specific reaction maintains if there

is a close relation between the transferred energy and the physical and chemical structure at the point of action, as in photochemical reactions. In this case only accumulations of energy of *definite* quantity can react with matter of definite structure. On this assumption H. Holthusen (Strahlentherapie 25:157, 1927) founded his objections to this theory. Wood (Radiology 14:1 (Jan.) 1930) does not believe that Dessauer's theory will stand final and definite proof. He does not feel that ultra-violet experiments, which represent a molecular and not an atomic action, would confirm an action which is atomic like the x-rays. We do not know that the first effect of x-rays on *protozoa* is an immediate increase in the permeability of the membrane, and that the permeability can easily be tested by dyes. Wood further defines minute microscopical changes, the cells become more granular, then in a few hours the protoplasm clears up and the granulation disappears. A great many phenomena observed in such large cells under radiation resemble those described in these protein experiments of Dessauer, but more convincing proof is required.

**BIOLOGICAL EFFECTS**—A comparison of the quantitative biological effects of gamma and x-rays was carried out in a very ingenious manner by C. Packard (J. Cancer Research 12:60 (Mar.) 1928). The purpose of the experiment reported in this article was to compare the lethal effect of gamma rays from a measured quantity of radium emanation with that produced by x-ray doses of known intensity.

The eggs of the common fruit fly or *drosophila* had been previously used by the author as a standard of measurement for the intensity of the action of the x-rays. The proportion of eggs killed depends upon the intensity of the x-ray beam and the length of exposure, the wave length is not a factor. When the intensity is lowered, the death rate is proportionately less, regardless of the wave length. The intensity of the x-ray dose can be estimated with considerable accuracy if the percentage of eggs hatching and the duration of the exposure are known. This test has been used to measure the output of an x-ray machine.

When a curve is plotted showing the percentage of a hatch after a certain length



of exposure to both gamma rays from radium emanation and the x-rays, the effect of radium and the x-rays seems to be quite closely parallel. As more than 50,000 eggs were used in the experiment, a considerable degree of accuracy was attained, especially when more than 30 per cent of the eggs were hatched.

Certain criticisms of this method of measuring radiation intensity, brought forward by Zuppinger, are answered.

The curves obtained by exposing tumor cells to these 2 radiations also corresponded quite closely.

It was assumed in these experiments that the wave length is not a determining factor in the biological effect produced, *i.e.*, that long waves are not biologically more active than short ones. This assumption, though not yet fully proved, is held as reasonable since biological effect and ionization are parallel within such a wide range of wave length that they are probably parallel within the short lengths not yet tested.

The law of Bergonie and Tribondeau has been generally accepted as explaining the fundamental biological action of rays on cell structure. Immature cells and cells in an active state of division are more sensitive to x-rays than are cells which have already acquired their fixed morphological and physiological characteristics. Resistance and susceptibility to the destructive action of x-rays and radium are questions of the rate of cell growth.

H. R. Schinz (Radiology 11 (Nov.) 1928) says: "The cell divides, but while it is undergoing division it seems to be in an excited condition. A dose of x-rays strong enough to necrotize the highly sensitive cells of lymphoid organs leaves unimpaired the less sensitive cells of a spindle-cell sarcoma or basal membrane carcinoma, excepting if it happens to strike them in the act of mitosis. In that event the cell succumbs."

**INDIRECT ACTION OF RADIATION**—Watjen (Strahlentherapie 29: 615, 1928) believes that the effect of the rays is directly on the cancer cells and not upon the surrounding tissues. A degenerative effect of the rays on cancer cells has been definitely shown histologically, but similar changes have been seen as a result of spontaneous tissue necrosis. There is an area

of inflammation around the irradiated cancer but the histological pictures indicate that it is secondary to the destruction of the cancer cells. Probably general reactions brought about by the products of disintegration of these cells also influence the whole organism. The rays also act on the blood and the blood corpuscles are very sensitive to their action, the blood serum is also affected, as shown by changes in its colloid content, and histological examination has shown that the endothelial cells of the vessel walls swell and are sometimes cast off into the circulation. Histological examination has not shown any changes in the nerves of the vessels in the irradiated region, but that does not prove that none take place.

**BACTERIA**—Long wave-length x-rays on *Staphylococcus aureus* and *microsporum Audouini* showed no effect at least *in vitro*, no change in the rapidity, quantity, quality or virulence of the irradiated cultures, according to A. Bertrand and A. Marin (Canad. M. A. J. 20: 496 (May) 1929).

From H. W. Sulkowitch's (Bull. Johns Hopkins Hosp. 44: 439 (June) 1929) experiments it is apparent that x-rays are lethal to bacteria and that different bacteria show varying degrees of resistance to x-rays. A long exposure to x-rays is necessary to produce bactericidal action because much less energy is given off by an x-ray tube than by the electric sparks and arcs used in the production of ultra-violet radiation. Most of the radiation emitted by the x-ray tubes was of 0.63 angstrom and 0.71 angstrom wave-length, and the relative intensities were 39 and 63, respectively.

In animal experiments, F. Bass (Zentralblatt Gynak. 52: 90 (Jan. 14) 1928) was able to increase the resistance to the streptococcus by local x-ray irradiation. The action of the rays appeared to extend beyond the site irradiated to distant cells. He believes that the effects of the irradiation are obtained through activation of the reticulo-endothelium, not directly, but by the products of cell decomposition. Leukocytes irradiated *in vitro* and then brought in contact with streptococci seemed to succumb more quickly than unirradiated leukocytes.

**BLOOD**—The effects of x-rays on the blood of rabbits was observed in the ex-



periments of W. V. Mayneord and A. Piney (Brit. J. Radiol. 1: 257 and 263 (Aug.) 1928). This report is based on experiments performed on rabbits. The ventral surface of the animals was exposed to rays of rather low wave length—0.375-Å. The factors were 90 kv., 29 ma., a distance of 24.5 cm., and practically no filter. With these factors, the full skin-tolerance dose was 540 R and was delivered in 28½ minutes. When large doses were given, the effect uniformly seen was a persistent lymphocytopenia. This effect was immediate. In 1 case the leukocytes were reduced to 600 cells during the administration of the dose (7 hours). This marked fall was soon followed by an increase in the neutrophils. The increase persisted but before the death of the animal the neutrophils were exceeded by the monocytes. No changes were noted in the number of red cells.

Smaller doses (500 R) were tried in 2 ways—in divided doses administered over a period of 23 days and in a single dose. Both methods caused a preliminary drop in the number of lymphocytes and a secondary increase in the number of neutrophils. Divided doses caused a more intense and prolonged disturbance but no monocytosis. The single dose caused a moderate monocytosis lasting several days.

H. Cramer (Strahlentherapie 28: 431, 1928) showed in animal experiments that in death from x-ray irradiation, destruction of the organs belonging to the reticulo-endothelial system takes place. The blood picture as affected by x-rays demonstrates the importance of the mesenchymal function as expressed in the lymphocytic curve, its activation through small doses, mild disturbance through moderate doses and irreparable damage through high doses. The role of the reticulo-endothelium and of the mesenchymal cells in general is that of a "remover of impurities" from the blood. The effect of x-ray irradiation on inflammatory processes is, in part at least, explained by the elective absorption of activating products of metabolism in the circulating blood. Organs characterized by the capacity to absorb dyes during life are likewise directly affected by x-ray irradiation. The differences in the sensitiveness of ovarian cells to x-rays is thus explained,

the primordial follicles do not stain vitally, whereas the ripe follicles stain well. Further, the action of x-rays may be ascribed to an increase in non-specific immunization and non-specific increase in bacteriolysis through complement activation. Freund's experiments have established that in protein therapy and its equivalents, the "proteinogenous amines" play an important role. He sees the action of histamine in the capillary dilatation or erythema. The analogy between histamine action and x-ray intoxication is seen in vagotonia, acidosis and in the leukocytic formula.

**Selective Action of x-rays on the blood cells of the Cat.**—The profound effects that radium and x-rays have on the bone marrow have been proven often clinically. The severe anemia resulting from prolonged exposure to radio-active substances frequently becomes a type of aplastic anemia. S. Wright and H. A. Bulman (Lancet 2: 217 (Aug. 3) 1929) show that the x-rays have a selective action on the blood cells of the cat. If the dosage is varied, different results will take place. The important factors that are brought out are as follows. The lymphocytes are decreased early and markedly, the polymorphonuclears show an irregular initial increase with a slower and slighter degree of decrease than the lymphocytes, changes in the red blood cells occur still later, in non-fatal cases the anemia develops slowly and recovery is gradual and is paralleled by the platelet count, in fatal cases a severe acute anemia develops with evidence of hemolysis and widespread hemorrhage without the blood platelets being affected.

**BONE.**—Bone is commonly considered the most resistant tissue of the body, because of its hardness and strength, to which characteristics it owes its adaptation to the physiologic function it has to perform, and because of the length of time it can withstand decay and other destructive agencies. It is, however, only as properties of dead material that the hardness and strength and resistance of bone are apparent. As a living tissue, bone yields readily to constant pressure, even of softer tissues, by undergoing atrophy and resorption, and it may be quickly destroyed in inflammatory and neoplastic processes.

Resistance to radiation has also been as-

cribed to bone. Older tables of x-ray dosages gave for bone a dose as much as 8 times that for the skin of the face. With widespread use of the more deeply penetrating hard x-rays, bone has been found to be not immune to injury. J. Ewing (*Acta radiol* 6 399, 1926) has described a form of chronic osteitis following irradiation, a proliferative process which is probably secondary to harm done, rather than a primary stimulative reaction. More recently, W. Wynen (*Munch med Wchnschr* 76 244 (Feb 8) 1929) has discussed the occurrence of late necrosis in bones subjected to therapeutic irradiation by x-rays. The process has been noted in the jaw and in bone connected with the exterior by fistulous openings, in the first case, in bone easily invaded by bacteria after harm has been done, and in the second case, in bone that is already infected but further injured by radiation. Experimentally, it was found by Wynen that the rootlets of seedlings were more severely injured when surrounded by bone and subjected to radiation than when surrounded by an equally thick layer of muscle, an action ascribed to the emission of secondary rays by the calcium of the bone. Similar secondary radiation, resulting in the death of individual bone corpuscles and in injury to the capillaries, is held responsible for the harm to bone that may result in late necrosis under the further influence of bacterial invasion. Too intensive irradiation of bone apparently introduces an element of danger which must be borne in mind in the application of the therapeutic procedure. Wynen warns especially against too heavy dosage in the treatment of bone and joint tuberculosis.

Similar sensitivity of bone to radiation has been noted by H. C. Martland, P. Conlow and J. P. Knaf (*J. A. M. A.* 85 1769 (Dec 5) 1925) as the result of the action of radio-active substances deposited in the bones of painters or luminous dialists. In these unfortunates, not properly warned or protected against the hazards of a new occupation, widespread necrosis of the jaw occurred. Here also, as is the case after x-ray irradiation, secondary bacterial invasion of bone injured by radiation is a factor. The injury to bone in dial painters is much more severe than has yet been de-

scribed after x-ray irradiation, because the action of the deposited radium and mesothorium compounds is continuous over a period of years, the bones of a body exhumed after 5 years of interment having been found to be strongly radio-active by A. V. St. George, A. O. Gettler and R. Muller (*Arch. Path.* 7 397 (Mar) 1929). Such continuous action leads not only to bone necrosis, but also to diffuse radiation osteitis and to injury to the hematopoietic system, the latter manifested by an anemia of either regenerative or aplastic type, which is one of the principal features of the effects of radio-active substances. As still another possibility in the chain of evils caused by the deposition of radio-active materials in bone, H. S. Martland and R. E. Humphries (*Arch. Path.* 7 406 (Mar) 1929) call attention to the occurrence of the osteogenic sarcoma of bone in 2 dial painters. The proof that the tumor was actually caused by the presence of radio-active substance in the bone is not and cannot be absolute.

*Treatment of Radium Poisoning*—Parathyroid extract—Collip in Treatment of Radium Poisoning—Three cases of "radium poisoning" in luminous dial painters have been subjected by F. B. Flinn and S. M. Seidlin (*Johns Hopkins Hosp. Bull.* 45 269 (Nov) 1929) to treatment by injections of parathyroid extract—Collip. The first case showed a loss of 45.6 per cent of radio-activity in 7 weeks. The third case showed a loss of 50.5 per cent in 7 weeks. All 3 patients show characteristic x-ray lesions in the skull, namely round, sharply circumscribed areas of rarefaction. A piece of skull removed during necropsy in a recent case of "radium poisoning" showed similar x-ray lesions.

**CELLS**—The influence of x-rays on cells was studied by G. Jansson (*Acta radiol* 8 427, 1927). An account is first given of the picture of the non-irradiated neutrophilic leukocyte and myelocyte in the dark field. All vital phenomena in the plasma, such as movements of the granules, drop displacement, and floating movements and all of the ameboid movements are described.

Ultramicroscopy shows that the neutrophilic leukocyte exposed to the x-rays is subject to deep disturbances. This is manifested in many different ways. The author

distinguishes between the different types of plasma changes and notes the varying degrees of progressive impairment of the plasma. These changes are indicated by a disturbance in the amoeboid movements and by the formation of the pseudopods, as well as by the granular movements, and the morphology of the plasma net. The final result of the damage sustained is death of the cell by liquefaction. The plasma remains in a fluid state during the gradually progressive changes in the cell. The different plasma changes frequently occur without any signs of alteration in the nucleus.

In irradiation of the neutrophile myelocytes the author has made the surprising observation that the plasma in these immature cells reacts qualitatively in a fundamentally different way from the plasma in the neutrophile leukocytes. Whereas the plasma of the myelocyte undergoes coagulation, that of the neutrophile leukocyte undergoes liquefaction. The experiments make it evident that the coagulation of the plasma varies in degree and extension within the cell. It is shown further that the plasma of the myelocyte is far more sensitive to radiations than that of the neutrophile leukocyte. Even in irradiation of the myelocytes, the changes in the plasma are in evidence before the nucleus shows signs of alteration.

**GASTRIC SECRETION**—A review of the literature reveals that the results of experiments to determine the influence of x-rays upon gastric secretion are confusing and conflicting. J. T. Case and W. N. Boldyreff (*Am J Roentgenol* 19 61 (Jan) 1928) attempted to study the results of a heavy dose of short wave-length x-rays upon both phases of gastric secretion. The first, or psychical, phase is that produced by the appetite, and the second or chemical, phase is that produced by the action of extractive substances and absorbed products of digested food upon the gastric glands.

The psychical phase was studied in dogs with a gastric fistula and esophagostomy. Sham feeding after the method of Pavlov was employed. For the study of the second phase, dogs were prepared with an isolated stomach pouch after the method of Heidenhain. In both phases, the quantity of secretion was diminished, although the effect

was temporary in both cases. There was no alteration in the properties of the juice secreted. The return to normal was slower in the chemical phase than in the physical phase, requiring about 8 weeks.

The authors conclude that high voltage, deep x-ray treatment acts only upon the functional activity, without destroying the vitality of the digestive glands, and that any result obtained in the treatment of gastric or duodenal ulcer is likely to be transitory.

**HEART.**—A. S. Warthin and E. A. Pohle (*Arch Int Med* 43 15 (Jan) 1929) studied the effects of x-ray treatment over the precordium of rats and rabbits, and note no effect with doses not exceeding the skin erythema. On the other hand, there is evidence to indicate that an excess amount of radiation can produce myocardial changes and suggest caution when treatment is necessary in this region.

**OFFSPRING**—H. Krukenberg (*Zentralbl f Chir* 56 387 (Feb 16) 1929) describes an experiment made by himself and Forsterling on 2 puppies of the same litter which half an hour after birth were exposed to x-rays. One animal was radiated only on the posterior half of the body, and the other only on the anterior half. In the first case there was arrested growth of the hindquarters, so that the animal suggested a giraffe or hyena, in the second animal there was a small head and short forelegs, so that it resembled a rabbit. There soon developed severe cerebral symptoms, tremors, inability to feed without assistance, ataxia, standing with bestraddled legs, and progressive optic atrophy of both eyes. The observation is communicated apropos of a demonstration by Beck, at the *Veremigung Nordwestdeutscher Chirurgen*, of 6 cases of growth interference by x-rays. Krukenberg's experiment was made in 1909.

H. J. Bagg (*Am J Anat* 43 167 (Mar 15) 1929) found a wide variation of anomalies following the irradiation with x-rays of mice before mating. Inherited defects were noted in the third and subsequent generations of animals that were descendants of treated animals. Since no such defects were found in over 2000 control animals, it was assumed that the presence of abnormalities was brought about by an alteration in the germ plasma as a result of irradiation.

These include various types of club feet, syndactylism, congenital amputation and polydactylism. Abnormalities of the limbs, blindness, absence of one or both kidneys, and hydronephrosis were also observed. These observations indicate a general tendency to arrests in embryonic development following irradiation. These abnormalities are definitely inherited. They are recessive to the normal in inheritance. When considered as one of the manifestations of a general tendency to abnormal structure, they approach the Mendelian expectation in behavior.

The effect of irradiation on pregnancies, particularly in so far as anomalies and the future health of children are concerned, has been a subject that involved a great deal of investigation by all intimately associated with radium and x-ray treatment. Individual observers and isolated clinics have massed together great numbers of cases with varying interpretations. In regard to the effect of irradiation upon subsequent fertility, it would seem, according to D. P. Murphy (Surg. Gynec. Obstet. 48:766 (June) 1929), that the interval of time between treatment and birth appears to lengthen as the amount of radium exposure increases from 200 to 500 mg-hr, whereas beyond the 500 mg-hr point no constant relation between the two seems to exist.

Of the pregnancies ending abnormally, most of them occurred following irradiation, taking place prior to the fourth month. However, the appearance in 1 case of a microcephalic idiot following irradiation as late as the sixth month, points to the possibility of damage to offspring when irradiation is practiced at that period in the life of the fetus. Since disturbances of a pathological nature which have appeared in offspring of mothers who received irradiation very frequently appear among the non-irradiated part of the population, none of these abnormalities can be regarded as pathognomonic of irradiation damage. There is no increase in the infant death rate that might be attributed to maternal irradiation.

If the risk of post-conception irradiation is great for injury, both as to the health and development of the child *in utero*, and if preconception ovarian irradiation is not detrimental to the health and development

of subsequent offspring, then real substantial information for guidance in the radiation management of these cases will have been established. It is very important, therefore, that post-conception irradiation of the pelvic tissues should not be employed during pregnancy if the child *in utero* is to be allowed to go to term, for there is a 40 per cent likelihood, according to Murphy, that the child will present some serious defect of such irradiation. It is incumbent, therefore, on the radiologist and gynecologist to establish the diagnosis of pregnancy. Such precaution will eliminate the possibility of irradiating an unsuspected living embryo.

W. Schmidt (Strahlentherapie 30:24, 1929) could trace no injury or abnormality in the offspring of 25 women with 42 pregnancies, all of whom were given irradiation for irregular menstrual disorders. (See also PREGNANCY AND PELVIC IRRADIATION in this volume.)

**RETICULO-ENDOTHELIAL SYSTEM**—The reticulo-endothelial system is probably of great importance in the combat of the organism against infection and against malignant disease. Animal experiments seem to demonstrate the fact that the function of this system is considerably inhibited following exposure of the organism to x-rays, according to J. P. Mischtschenko (Strahlentherapie 32:154, 1929).

Reticulo-endothelial system involves the phagocytic cells of the spleen pulp, bone marrow, lymph glands, Kupffer cells of the liver and the reticular tissue in general (Warthin). E. A. Pohle (Am. J. Roentgenol. 22:439 (Nov.) 1929) attempted to study the effect of irradiation on this complicated system by noting the toxic effects and reactions following the injection of trypan-blue and Congo-red in the ear vein of rabbits. No conclusions could be submitted on the basis of these studies. Their findings were at great variance with those reported by other observers.

J. P. Mischtschenko (*loc. cit.*) attempted to observe the effect of x-rays on the reticulo-endothelial system by studying the fight against blastomatous growths and phagocytosis of colloidal substances. Since this system plays such an important part in the fight of the organism against the spreading of a malignant tumor, a too in-

tensive irradiation of the reticulo-endothelial cells, in the light of his experiments, may lead to an extension of the neoplastic process. These observations are not in conformity with the findings of E. A. Pohle (*loc cit*), who feels that any known method of studying the irradiation effects on the reticulo-endothelial system are wholly inconclusive and unsatisfactory.

**SERUM**—Pfahler and Cohen (Am J Roentgenol 22 447 (Nov) 1929) observed no synergistic effect from the subcutaneous injections of irradiated ascitic fluid used simultaneously with deep x-ray therapy in 3 cases of generalized abdominal carcinomatosis of ovarian origin. M. Strumia (Am J M Sc 177 676 (May) 1929) was able to get a clinical response in a case of myelogenous leukemia by 2 autotransfusions of irradiated blood, comparable to the usual good responses obtained by radium or x-ray radiation to the spleen and long bones.

Radium and x-rays affect the hemopoietic centers by an indirect generalized action, rather than by a direct local effect. It is not yet clear whether this indirect effect is produced by the blood transfer of emanations to the bone marrow, or by the extramedullary production of leukotoxins, which are then transported to the bone marrow. In the treatment of **myelogenous leukemia** by radium or x-rays it is the dosage, rather than the place of application, that is important.

**SKIN**—A study was made by V. C. Jacobson and K. C. Waddell (Arch Path and Lab Med 5 195 (Feb) 1928) of the biologic action of cathode high voltage x-rays on the skin of the white rat, the new Coolidge tube, a modification of the Lenard tube, being used. The intensity of the reaction of the skin varied according to the voltage and the length of exposure to the cathode rays. As the cathode rays produce hyaline fusion of the collagen of the corium, and since the characteristic lesion of x-ray injury is a similar collagen degeneration, the evidence seems conclusive that the biologic effects heretofore attributed to x-rays are not due to x-rays, but to the cathode rays which they produce in the tissues.

**VITAMINS**—X-rays not only destroy cancer cells, but may induce cancer, ac-

cording to M. T. Burrows, L. H. Jorstad and E. C. Ernst (Radiology 11 370 (Nov) 1928). Cancer may be induced also by coal-tar and other lipid solvents. This phenomenon appears to be due chiefly to a disturbance of the balance of vitamins in the body. In experiments on rats, the authors noticed that the animals living on dog biscuits alone succumbed to the x-ray irradiation rather quickly, whereas those given either cod-liver oil or milk survived for a considerable time.

In the treatment of **cancer** with the x-rays, both the cancer cells and the surrounding tissues are affected. One of the effects of the x-rays on the tissue seems to be the removal of the normal lipid content. This action may be the chief factor in the destructive action of the x-rays on the cancer tissue.

**CONTRAINDICATIONS TO RADIUM**—It is perhaps just as important, if not more so, to know when not to use radium, as it is to know when radium is indicated in the treatment of **uterine cancer**. According to G. I. Strachan (J Obst and Gynec Brit Emp 34 291, 1927), in cases blanched from excessive blood loss radium treatment is often followed by severe systemic disturbance, shown by pelvic pain, nausea and irregular pyrexia, with an occasional rigor. Generally speaking, the local result of treatment is not good in such cases, the symptoms are not influenced and early death ensues. In such cases the anemia should first be treated by rest and administration of iron or blood transfusion before radium is applied. He believes that with a red cell count of less than 3,500,000 radiation is undesirable and that with a count below 3,000,000 it is contra-indicated. A *foul sloughing surface* to the carcinoma is a second contraindication. In such cases, immediate radium treatment is apt to be followed by massive necrosis and considerable toxemia. Such cases should be treated by douching and by swabbing the foul surface from time to time with iodized phenol until the surface is clear. If a *pyometra* is found, radiation should be delayed until the uterine cavity has been thoroughly drained. He makes it a routine practice to explore the cervical canal in all cases in order to detect this complication, and it is worthy of note that in

every case in which pyometra has been found it was unexpected, there being no pyrexia or abnormal uterine enlargement. The presence of *inflamed appendages* would also cause one to postpone radium treatment. This complication may be very difficult to elicit even under anesthesia, but if it is suspected, radiation should be postponed until the condition has subsided under rest and palliative douching. *Fistula formation* is an absolute contra-indication for radium, and if such a complication develops during treatment radium should not again be applied. Undoubtedly most of those who work with radium are well acquainted with most of these contra-indications, but the referring physicians should be better acquainted with them so that they will not insist on the application of radium to patients whose condition will only be made worse by such treatment.

**TECHNIC**—Accurate technic will insure more certain results and will be invaluable for evaluating a particular procedure. There are 6 factors involved in formulating a dose of x-rays. Some may be combined, such as voltage and filter when expressed as wave length and milliamperage and time when expressed in x-rays or r units. These factors are voltage, milliamperage, time, distance, filter and port or area of surface irradiated. The voltage and filter determine both the quality and quantity of radiation, the milliamperage, the intensity, and when multiplied by the time becomes quantity. The quantity also depends upon the other 2 factors, distance and port. Quantity varies with the size of the port. A warning to reduce the dose when large areas are irradiated has generally been considered sufficient on formulæ for superficial therapy.

**RADIUM NEEDLES**—C Regaud (Am J Roentgenol 21 1 (Jan) 1929) advocates the use of removable radium needles, because they can be more easily adjusted to heavy filtrations. He objects to the leaving of minute capillary tubes or seeds with radon in the tissues because of their diffuse caustic action and the frequent necrosis resulting therefrom. This objection has been clearly overcome by the use of gold capsules or seeds to hold the radon, with filtrations of 0.2 to 0.4 mm which has been developed so accurately by Failla and

Quimby (Am J Roentgenol 23 49 (Jan) 1930). A homogeneous radiation by careful spacing of implants can be obtained with almost mathematical precision and lesions are now treated on the basis of their size and predetermined doses can be adjusted so that as much as 8 to 10 erythema doses can be administered to a given area without destruction.

While E. H. Quimby and H. E. Martin (Am J Roentgenol 21 240 (Mar) 1929) have worked out the distribution of *radon* (radium emanation) seeds with a mathematical precision that is most effectual and accurate, they admit of possibilities of error in estimating the optimum dose and distribution of sources which would be difficult to calculate, because the actual insertion of the tubes could not be done to a definite specification so that the dose could be worked out on a geometric basis. The fundamental premise of their experiments was based on the fact that around each tube there is assumed to be a zone that will receive 100 per cent of an erythema dose. In order to irradiate a mass effectively with a group of tubes, these should be placed so close together that these 100 per cent zones are in contact. It is best from the clinical standpoint to consider all masses as spheres or as combinations of spheres. They advise overdosing if there should arise any question of an adequate dose.

Hopwood and Smallman, St Bartholomew's, London (Brit M J 2 1117 (Dec 14) 1929) gave an interesting account of radium containers—230 of them, chiefly needles, containing approximately 500 mg of radium element. These had been used in the treatment of 900 cases during 2 years, and usually about 50 or 60 per cent of the needles were in employment. This efficiency figure was reduced, of course, by the fact that many of the patients treated were out-patients, and therefore only in attendance for short periods, and by the fact that some of the applications were of a special kind involving a restricted use. Speaking broadly, needles of 1 and 2 mg content in radium element had been found to be the types best adapted to the purposes of a general hospital. A very large number of needles—50 per cent or more—were damaged during the year,

though most of the damages were trivial. Long needles were much more vulnerable than shorter ones, and needles used for surface application were less liable to damage than those inserted into deep malignant growths. The policy of classifying a needle as "damaged" for every trivial injury, and setting it aside for immediate repair, had been thoroughly justified by results. Leakage of emanation from damaged needles was a comparatively rare occurrence if the needles had been gold-soldered. The intensive use of radium was likely to be accompanied by the temporary or permanent loss of some containers. When a loss was suspected it was advisable immediately to stop the dispatch of refuse or laundry articles from all departments of the hospital, and to institute a visual and electroscopic search. Containers which had accidentally passed through an incinerator might have lost all their emanation owing to the melting of the solder used as a seal, no reliance, therefore, should be placed on negative findings by an electroscope in such case. During nearly 10 years, the radium department at St Bartholomew's had sustained a permanent loss of 4 needles, with a total content of 4 mg. One needle was known to have been buried with a patient, and 3 were untraced.

When radium *puncture* was first begun it was thought that it might become the method of choice in the majority of cancers. Instead, its use has been gradually restricted, so that at present it is employed only for cancer of the tongue, and at times for thick or exuberant cancers of the skin, some cancers of the breast, some cancers of the soft palate and floor of the mouth. There is some difficulty in getting a uniform distribution of the radium points, and therefore a homogeneous radiation is not always possible to obtain.

C Regaud (*loc cit*) advises the use of platinum iridium needles, hollowed out from point to eye, with wall thicknesses 0.4-0.5 mm, with variable lengths, so that approximate sizes can be chosen according to the thickness of the tissue which is to be irradiated. The needles hold one or more cells or radium "points," about 15 mm in length each. These cells contain radium element or preferably radon. In longer needles 2, and sometimes 3, of these

cells are placed end to end within the cavity of the needle and form a practically continuous radiating focus of 15 to 45 mm length. These needles are inserted directly through the covering surface directly into the tissues to be irradiated. Special forceps or "pushers" are employed for this purpose. The needles have a double eye, which accommodates 2 silk threads. Once the needle is in place, one of the threads is used as a suture to fasten the needle to the skin or mucous membrane and is cut short, while the second thread is permitted to remain long so as to facilitate the later removal of the needle. When the desired dose has been administered, the retaining suture is cut and the needle is removed by pulling on the longer safety thread.

**RADIUM "BOMB,"** or so-called heavy radium pack, is probably one of the newest experiments in radiation treatment. Up to date, the Curie Institute of Paris, the Radiumhemmet of Stockholm, the Memorial Hospital of New York, and the Howard Kelly Hospital of Baltimore are in the midst of careful observations that will soon tell whether this large pack—about 4 grams of radium—administered through one port at the same time, will have any particular merit over smaller intensities for longer periods of time. At the Memorial Hospital, J J Duffy (*Am J Roentgenol* 22 52 (July) 1929) says that when a patient is referred for external treatment with the 4-Gm pack, a tracing is made of the body and the tumor drawn according to scale. By means of the transmitted light equipment, the distance of the irradiation and the number of ports required are determined before he returns for treatment. The skin dosages of the 4-Gm pack are 16,000 mgm-hours at a distance of 6 cm, 28,000 mgm-hours at a distance of 10 cm, and 60,000 mgm-hours at a distance of 15 cm. Each treatment is limited to 2 hours. Sixteen thousand milligram-hours given in consecutive hours, or in equal parts on consecutive days, yield practically the same effect, but when 60,000 mgm-hours at a distance of 15 cm are given over a period of 15 days, the changes produced in the tumor mass are less distinct. Duffy states that at a depth of 11 cm there is 1 per cent greater absorption from a radium pack than from x-rays at 200 kv with a filter of 1.5 mm of



copper and a target-skin distance of 40 cm. At lesser depths the x-rays permit a relatively greater absorption. Duffy has obtained a better clinical response from radium than from the x-rays.

**DRESSINGS** — Use of radium-coated dressings is advocated by M. Heiner (Med Klinik 24 735 (May 11) 1928), who recommends pieces of linen coated with a varnish containing radium as convenient for use in the treatment of **chronic skin diseases, muscle and joint inflammations, neuralgias**, etc. This method of treatment is particularly useful in cases in which a stormy reaction is not desirable, such as light and moderately severe cases of **exophthalmic goiter**. The loss of radio-activity is only that natural to radium in any form.

**TOLERANCE DOSE FOR X-RAY TECHNICIANS** — "Tolerance dose" means the amount of x-ray energy that a person may receive continuously or at repeated intervals without suffering any damage to the blood or reproductive organs. This is probably best expressed as "r" units of radiation or in terms of an erythema dose (L. S. Taylor (Am J Roentgenol 22 45 (July) 1929). The actual values of this dose should be stipulated by the radiologist and not the physicist. The determination of this tolerance dose is difficult and uncertain. The biological factor differs greatly among individuals. Considerable latitude must be given to any recommendation that is to be finally weighed against physical measurements. A. E. Barclay (Am J Roentgenol, 1928) and A. Mutscheller (Radiology 6 314 (Apr) 1926) have made valuable contributions on such tolerance dose measurements. G. W. C. Kaye (Am J Roentgenol 18 401 (Nov) 1927, Brit J Radiol 1 295 (Sept) 1928) has summed up the tolerance dose as estimated by 5 investigators, and from these data finds that a person may receive without injury up to  $\frac{1}{1000}$  of an erythema dose in 5 days. In each case a generous factor of safety has been allowed. The fact that this figure includes a large safety factor makes it unnecessary to stipulate the quality of radiation or to state whether the whole body is exposed or only a portion of it. The determination of a dose tolerance can only be done empirically. A

number of hospitals are first chosen as being representative. In each, every worker is carefully examined for any physical damage to the blood or tissues. When they are found to be sound, a careful record of their day is made to determine the amount of exposure to radiation. The intensity of the radiation is estimated with a delicate ionization equipment and recorded in terms of r units. Dividing the number of r units by the number of working minutes per day gives the dose in r/min. This can be converted into any desired unit for convenience. Mutschler worked out a formula for estimating the dose at different distances from the x-ray tube. Even though liable to considerable error, a fairly uniform and relative method for determining the degree of protection is thus obtained.

**PROTECTION** — L. S. Taylor (Am J Roentgenol 22 45 (July) 1929) considers that in deep and superficial therapy rooms it is desirable, in general, that the nurse and technician be completely isolated from the patient, since this affords complete protection from both direct and scattered radiation. The rooms should be constructed of protective material, such as lead or plasters like barium sulphate. Sheet lead, varying from 1 to 5 mm in thickness, must be used, according to the voltage used to generate the x-rays.

**RADIOSENSITIVITY** (J. Ewing Radiology 13 313 (Oct) 1929) to radiation has been definitely established according to the grade of malignancy. The more highly cellular, the more highly malignant and, conversely, the more radiosensitive. These cellular characteristics are now established according to microscopic determinations.

M. Cutler (Arch Surg 18 2303 (June) 1929) has studied radiosensitivity of lympho-epitheliomas and transitional cell carcinoma. Because they are extremely radiosensitive, they are extremely malignant, and surgery is to be discouraged.

**WAVE-LENGTHS** — S. Russ and G. M. Scott (Brit J Radiol 2 301 (June) 1929) found that 6 times as much short wave-length energy as long wave-length energy must be expended in a layer of skin in order to produce equal reactions, and that this factor falls to about 2.6 in the case of the tumor. The reaction in the skin and tumor depends not only on the amount of



energy absorbed by the tissues, but upon the particular wave-lengths of the radiations. The extent of this differential action appears to depend on the nature of the tissues. These writers suggest that the phenomenon of selective action is really due to the varying extent of the differential action in one tissue and another, and that this seems a natural deduction to make from these observations on the skin and tumor.

**SELECTIVITY** — It is generally admitted that, if a beam of radiation traversing 2 or more tissues, affects one more than the other, although the same amount of energy has been absorbed in each case, this is evidence of selective action. If the Jensen's rat sarcoma experiments had been limited to the group of wave-lengths 45 to 30 A° (soft rays), there would be nothing to suggest a selective action of the rays which could be taken advantage of therapeutically, since about 17 times the permanent depilation dose is needed to cause a lethal action on the tumor cells.

When the wave-length is shortened to about 1 A°, however, only 75 per cent of the permanent depilation dose is needed to kill the tumor cells. So that, not only for the short wave-lengths' greater penetrating power, but also because of the change in the right direction of the differential factor, it seems it must be more satisfactory to use short wave-length radiation for any subcutaneous growths. Though just as much actual energy is liberated in the tissues by short wave-length radiation, the ionization gradients are not so steep, and it may be that considerably more energy has to be expended in these cases to cause disturbances, from which the cell cannot recover, than is needed when using the rays of longer wave-lengths. It seems possible, too, that the power of the tissues to tolerate indefinitely very weak radiation, which is below a certain intensity, may be explained in the same way.

**THERAPY** — Referring to *radium*, H S Souttar (Brit M J 1 538 (Mar 23) 1929) states that, for the first time in history, medical science has in its possession an agent which can cure cancer beyond any doubt. Radium can destroy malignancy without surgical removal of the lesion. Every surgeon should, therefore, know

what can be done with radium therapy, should understand the methods by which it is applied, and should explore its possibilities to their utmost limits.

Radium decays one-half in 1750 years. Radium A decays one-half in 3 minutes. It is to the rapid decay of radon and the other elements in the center of the radium group that the surgical possibilities of radium are due.

The author cites Rutherford's description of the atom as a minute "solar system." He describes the hydrogen atom as a type, and discusses electrons and the structure of an alpha particle as the nucleus of a hydrogen atom. The electron set free to fly through space is a beta particle. The radium atom is of enormous complexity, with a cluster of 226 protons and 138 electrons grouped together to form a nucleus and more than 88 electrons whirling about the nucleus. As various alpha particles are discharged from this "solar system" and electrons are projected into space, the atom changes to another form. This process is interpreted as decay. The alpha particle, which carries a positive electrical charge, proceeds at a velocity of 10,000 miles a second, but will not penetrate a thin sheet of paper. It has no value in surgery. Beta rays, which are negatively charged electrons traveling at the rate of 180,000 miles per second, are entirely stopped by 0.3 mm of platinum or 1 cm of body tissue. Their surgical action is very local. They are often screened out altogether. The gamma rays are ether waves of a wave-length less than one-fifth-thousandth that of light. They have the velocity of light and can penetrate several inches of lead. In passing through 4 in of body tissue they are reduced 50 per cent. The beta rays are used chiefly to destroy superficial lesions. The gamma rays cause the disappearance of a malignant tumor and its replacement by a scar of a much milder character than the beta-ray scar. Radon, the emanation of radium, decays one-half in 4 days. It can be separated from radium and packed in convenient containers having all the powers of radium. Its value must be determined by reckoning its gradual decay. A useful rule is that the total radiation of 1.5 mc of radon is physi-

cally equal to that of 1 mgm of radium in a period of 8 days

A common apparatus for the application of radium consists of *needles* containing radium elements or radon gas. The needle commonly employed at the London Hospital is made of platinum with a thickness of 0.5 mm which cuts off the beta rays. It is packed with radium sulphate in the strength of 1 mgm per linear centimeter. These needles are inserted into the tissues and homogeneously distributed chiefly in the growing edge of the tumor. It has been observed that in a 5-day exposure 1 mgm of radium can destroy the cancer cells in a cubic centimeter of tissue. The treatment of a case of **carcinoma of the breast** is described as an example of the introduction of radium needles. Two groups of needles are inserted into and beneath the tumor itself on different planes, the 2 rows following the lymphatics along the borders of the 2 pectoral muscles. A third group is placed in the axilla, and a fourth group beneath the clavicle in the region of the costocoracoid membrane. A fifth group is placed above the clavicle, and a sixth group in the upper 5 intercostal spaces and the rectus sheath. Between 40 and 50 needles containing from 75 to 100 mgm are left in place from 7 to 9 days.

N S Finzi (Brit M J 1 1117 (Dec 14) 1929) describing radiation therapy in **malignant disease**, said that it was more than 20 years since he began to use radium, having been impressed by what Dominici was doing at that time in Paris. During those 20 years radium had alternated in favor with x-rays, but the truth was that each agent had its own sphere in relation to different cases, and in some instances the combined use of both agents was required. It was incumbent upon the radiologist to have a full knowledge of both. While radical x-ray treatment had been rather looked upon with disfavor in this country, when the results of St Bartholomew's radiotherapeutic research department were published, those who held that view were likely to receive a shock. At the present time there was a boom in radium treatment, a matter of sorrow to radiologists, because booms were followed by slumps, and it took a long time for the pendulum to revert to a more normal movement. On the question of the

*radium "bomb,"* he said that this had many of the advantages of x-ray treatment in dealing with large areas, but the rays were more penetrating, and therefore more effective physically, and, he believed, biologically. From the point of view of physics, of course, the "bomb" was very inefficient, it would treat only 3 patients during the time that the same amount of radium, used in needle form, would treat 100.

In deciding as between radium and x-rays, Finzi was of the opinion that in the case of very radiosensitive growths, such as **lymphosarcoma** and other rapidly growing tumors, x-rays constituted the treatment of choice. In very small growths of a type which tended to remain localized, radium was indicated every time, the classical example was **rodent ulcer**. The position of the neoplasm was important. In **growths** in the region of the **mouth** and **upper air passages** the best results had been obtained either with x-rays alone or with a combination of x-rays and radium. Turning to **tumors of the cervix**, the speaker said that the combined method, radium for the local growth and x-rays for the gland areas gave very good results, with x-rays alone a tendency to recurrence had been observed at the site of the primary lesion. In **rectal carcinoma** radium seemed to be definitely more effective than x-rays. In breast cases, if the mediastinum was involved, radium needle treatment was useless, but the case could still be treated by x-rays. He had had 2 patients with **carcinoma of the breast** in which mediastinal metastasis had been treated by intensive methods lasting for 2 or 3 weeks, both were now well after 5 years. His final conclusion was that in operable growths in a number of situations radium treatment had now ousted surgery.

C Regaud (Brit J Radiol 2 461 (Oct) 1929) believes that the cure of **cancers** by x-rays and gamma rays is susceptible of great progress, particularly in the order of radiophysiology. Nevertheless, this method is limited. We do not consider it as a panacea, far from it. Besides, people and even the doctors do not always realize its serious difficulties. The cure of cancers of the epidermoid group by radiation is an important and probably definite advance

But for the majority of the other groups of cancers, it is toward general therapeutics that we must direct our hopes. Whilst awaiting their realization, early diagnosis and early and proper treatment remain the factors of progress which will do most to increase the efficacy of surgical and radio-therapeutic methods. These essential tasks are incumbent on social and medical organizations, and on the education of physicians and the public.

**RADIO-ACTIVE WATERS AND SOLUTIONS** were discussed at length in an editorial (J A M A 93 771 (Sept 7) 1929) and the merits of this form of treatment held as "unproved and unsubstantiated." For this reason the Council of Pharmacy and Chemistry has issued the following statement:

From an examination of the available evidence, it appears that the value of the internal use of radium solutions or of water containing radon in chronic arthritis, gout, neuritis and high blood-pressure is not demonstrated by controlled clinical evidence, that in spite of many years of trial, acceptable evidence has not become available and, until such evidence does become available, the Council has decided not to accept generators for the production of water charged with radon or radium solutions intended for intravenous use.

**SUPER RADIUM** is a substance which has been under experiment in some of the German radium institutes (Am J Roentgenol 21 595 (June) 1929) and is a combination of a new alloy with radium which is supposed to be capable of radiating 20 times more gamma rays than any other preparation now in use. The substance is an alloy obtained by melting radium with platinum, the method of melting being as yet kept a secret. If the results already obtained by the experimenters continue and are corroborated by other experimenters in foreign countries, the new alloy will revolutionize the radium industry, since it will be much cheaper than the now costly radium. This will make radium available to all hospitals and other medical institutions. At the present price of fifty thousand dollars a gram, only a few hospitals and clinics—in Europe, at least—have been able to afford 1 gram, though this amount is necessary for obtaining the best results

in the treatment of cancer. In addition to the costliness of radium, it was recently announced in a leading Continental journal that a scarcity of radium threatened. Recent statistics show that the world production of radium has decreased during the past few years, in spite of the erection of new plants in Canada and Australia. The commercial preparation of the new alloy will start in the next few months.

**RADIUM versus SURGERY** is not a great issue where systematic conferences between surgeon, radiologist and pathologist exist. Both radiation and surgery play an important rôle in the treatment of cancer and in many instances, either one of these agents alone is adequate for cure. In discussing this idea, the National Radium Commission of England (Brit M J 2 911 (Nov 16) 1929) believe that the relative value of radium therapy in the treatment of cancer, as compared with surgical excision, is a difficult point to assess, for the reason that sufficient facts are not yet available. In the first place, most of the available data concern cancer only in the regions of the body above mentioned, and, secondly, we have not yet a sufficient number of cases, nor has sufficient time elapsed, to enable us to prepare statistics which will show a true and complete picture. One great point in favor of radium is that its use does not involve the risks and suffering associated with extensive and mutilating operations, which are so distressing to all concerned. The operation of introducing the radium is in itself a comparatively slight one, and while the radium is in position the patient suffers little if any discomfort. Under these conditions, and with good prospects of cure without mutilation, patients should be far more ready to consult their doctors, instead of concealing or disregarding their symptoms till it is too late for any form of effective treatment.

**MEASUREMENTS** — C Packard (J Cancer Research 11 282 (Oct) 1927) worked out a standard biological measurement for determining x-ray doses by the use of eggs of the fruit fly *Drosophila*. These eggs are used as a dosimeter for estimating x-ray dosage. Within certain limits there is a correlation between dosage and effect. Because a large proportion

of the eggs is normally resistant to x-rays, the lethal dose must have a sufficient intensity to kill the individual in a short time. This is probably true also for those tumor cells which show the same type of variation in sensitiveness to radiations. It cannot be assumed that twice the dose to kill half of the cells will kill them all, as Mottram holds.

Certain standards of measurements were set forth by the Second International Congress of Radiology, which adopted a unit of x-ray intensity, and agreement upon certain standards of protection against the dangers inherent in the use of the x-ray and radium. The unit of measurement adopted by the Congress (June, 1928) is defined as follows: "The International unit is that quantity of x-radiation which, when the secondary electrons are fully utilized, and the wall effect of the chamber is avoided, produces in 1 c.c. of atmospheric air at 0° C and 76 mm. mercury pressure, such a degree of conductivity that 1 electrostatic unit of charge is measured at saturation current." The unit is to be called "the Roentgen" and is to be designated by the small "r." It will be seen that this is the unit of measurement proposed by Behnken and called the German r unit which corresponds approximately to 2.50 Solomon or French r units.

The importance of the action of the Congress lies, therefore, not in recommending a new unit of measurement, but in giving international authority to a unit already in use. When writers in all parts of the world adopt the r unit it will be possible for workers everywhere to duplicate each other's work. It must always be remembered, however, that simply stating the dosage in r units does not convey any idea of the quality of radiation used, to describe the conditions definitely, it is necessary to specify not only the number of r units but also the effective wave-length after the half-value method or the method of Duane.

The Congress set forth protective measures in detail, which in short set forth the maximum as 7 working hours a day for 5 days a week and 1 month's holiday a year. Considerable emphasis was laid upon the planning of a department with good ventilation, and walls covered with a minimum

of 2 mm. of lead, to protect the operator against the radiations from therapy rooms. Insulated floor coverings, grounding of metals, circuit breakers to guard against surges, careful checks of all electrical controls—voltmeters and ammeters, etc.

*Saturation* — G. Failla (Radiology 12 (Apr.) 1929) describes the difference between the saturation dose and the fractional dose methods. In the latter case the treatments spread over a period of time, are all of approximately the same magnitude. In the saturation dose method, the initial treatment is large, so as to deliver an erythema or suberythema dose to the patient at one sitting, and subsequent treatments are small, with the idea of compensating for the "loss effect" during the time interval. Regaud, of Paris, who is the chief exponent of the fractional dose method in radiotherapy, claims that the tumor cell, dividing more rapidly than the normal cell, is more apt to be caught at its most sensitive stage when the repeated small doses are administered at short intervals. On this basis a more marked effect should be produced in the pathological tissues than in the normal tissues by the fractional dose technic. The saturation dose technic might be considered to be a combination of the massive and fractional dose methods. The best method can be determined only by careful comparisons. Roentgen treatment on the basis of saturation is an evolution of the general experience of radiologists that fractional doses may be carried on for a period of ten days to three weeks according to the amount of treatment at each sitting (intensity) and continued until a total dose through a single port reaches 150 to 200 per cent of an erythema, depending on the area treated as well as the size of the field. L. B. Kingery (Arch. Dermat. and Syph. 17: 423 (Apr.) 1928) attempted to apply this idea to the treatment of skin diseases and was successful to the extent that he was able to draw up a mathematical curve which relatively represents the loss of radiation in the tissues. Pfahler (Radiology 11: 181 (Sept.) 1928) applied this same principle of determining the loss according to a curve, and in this manner radiation principles of therapy can be carried out with a uniform-

ity that renders the application of radiation a more exact procedure

**INFECTIONS**—On the basis of results obtained in 300 patients with various kinds and stages of **inflammation of the genitalia**, F Seisser (Strahlentherapie 33 471 (Aug 26) 1929) recommends x-ray irradiation in all old refractory and recurrent inflammations of the uterine adnexa. In a large number of cases it renders operation unnecessary. By means of it one can obtain complete clinical and anatomic healing even in some cases in which the process is far advanced. Repeated weak irradiation, which is the method of choice in **tuberculosis of the genitalia**, is indicated also in inflammations of different origins. In the great majority of cases unilateral castration is a particularly suitable, simple and effective method of irradiation in inflammation of the genitalia and is to be preferred to the unreliable, dangerous and technically difficult temporary sterilization. In women approaching the menopause (exceptionally in younger women), one is justified in performing complete castration. In rare cases of the most severe forms of **pelvic peritonitis** and **parametric infiltration of the pelvis**, still larger doses of x-rays (up to the "cancer dose") are indicated.

F Pordes (Strahlentherapie 33 147 (June 29) 1929) distinguishes 2 types of results in x-ray irradiation of inflammatory processes. In the one, involution within a few days has taken place, in the other, a series of small foci may develop. Infections that are of recent date react more favorably than older ones. The retrogression of the inflammation or abscess may complicate the indications for surgical action.

J Liebersohn (Strahlentherapie 32 356 (Apr 17) 1929) states that he has obtained good results in the treatment of hundreds of patients with **ulcerative and hypertrophic lupus** by small doses of x-rays (from 8 to 10 per cent of a unit skin dose). With this form of treatment he has obtained improvement or cure in 75 per cent of cases of **eczema**, **sycosis**, **lymphadenitis**, **arthritis**, **radiculitis**, **neurodermatitis**, **genital pruritus**, **acne vulgaris**, **acute lymphadenitis**, **abscess**, **phlegmon**, **panaritium**, **hordeolum**, **otitis media** and **periodontitis**. The author believes that improvement in inflammatory conditions following the use of this form of

treatment is due to an increase in the immune-biologic processes in the organism.

L Heidenhain (Strahlentherapie 24 37, 1926) reviews 855 cases of different infections treated with x-ray therapy. Of 34 cases of severe **furuncle of the face**, 33 were cured. **Lymphangitis**, with and without swelling of the lymph glands, usually disappeared within from 24 to 48 hours. The results were favorable in **peritonitis** if the pus was removed and the irradiation was begun immediately after the operation. Early treatment of **phlegmonous angina** had an especially good effect on the general condition of the patient. **Adnexal infections** of the female generative organs showed rapid improvement. Of 30 irradiated **erysipelas** cases, 22 responded to the treatment. A large field was usually irradiated with minimal doses for from 2 to 3 minutes, and a 5 mm aluminum filter was used.

G Gambarow (Strahlentherapie 26 698, 1927) believes that weak irradiation of the pelvic adnexa should not be used in inflammatory diseases on account of its slight therapeutic effect and the danger to the offspring. Temporary castration is very much superior to other physical and conservative methods in chronic and subacute inflammations of the adnexa as its results are extremely good. Because of the possibility of injury to the offspring and severe signs of artificial menopause, temporary castration should only be used when conception is not to be expected, for instance, on account of severe gonorrheal and tuberculous adnexitis, and when other conservative methods of treatment have proved ineffective.

P Abbati (Radiol med 15 1011 (Oct) 1928) made an exhaustive review of the literature to record the advantages of the x-ray treatment of acute and chronic inflammatory conditions and quotes Heidenhain who observed the results in 855 cases, including 27 different groups of inflammations, some of them very severe, with 76 per cent good results. Abbati also quotes the results of Fried whose experience with 1500 cases embracing **pelvic infections**, **pneumonia**, **furunculosis**, **erysipelas**, etc., leads him to interpret the good results as due to an increase of the bactericidal power of the blood following x-ray treatment.

**Arthritis**—K Kading (Strahlentherapie 31 135, 1928) urges the use of x-rays in all cases of arthritis where other methods of treatment have failed. Very mild doses—15 to 35 per cent of an erythema dose—have been sufficient in his experience. He found x-ray therapy of considerable value in the different forms of arthritis. In **chronic arthritis** the application of x-ray therapy is local. In the affections of the joints, due to endocrine disturbances, an *irradiation of the pituitary gland or ovaries* by means of stimulative doses is indicated. In cases of **purpura rheumatica**, as well as in certain **tuberculous** affections of the joints, an *irradiation of the spleen* is of considerable value. Some truly remarkable results were obtained in **gonorrheal infections of the joints**. In **gout** the irradiation should be carried out only in the chronic forms.

**Pneumonia**—It has been recognized for some time that irradiation of infected tissues, such as **furunculosis**, **cellulitis**, etc., markedly accelerates the natural process of resolution. This is accomplished, as in nature, by 1 of 2 methods: either by regression and disappearance or by suppuration followed by resolution. The exact *modus operandi* is not understood, as in many other effects of irradiation, though it is generally believed to be a local change in the chemistry of the tissues. E A Merritt and E M McPeak (Am J Roentgenol 23 45 (Jan) 1930) report prompt and gratifying regressions in the x-ray treatment of unresolved pneumonia, and believe it is a distinct advance to the meager and unsatisfactory methods in common use.

**Leucutia** (Am J Roentgenol (July) 1929) found that **septicemias**, especially the **puerperal** form, were benefited by small doses of x-rays. Irradiation in very moderate doses, in conjunction with surgery, was employed with improvement in **chronic osteomyelitis**. He claimed remarkable results in the x-ray treatment of **gonorrheal arthritis**. The sooner the treatment is instituted, the better the results. He warns that other therapeutic measures such as immobilization, diathermy, vaccine therapy, etc., must be carried out.

**OVARIAN DYSFUNCTION**—The correction of menstrual disorders by *irradiation of the ovaries and hypophysis* has

shown most gratifying results in selected cases. Favorable influences have been noted in cases of **habitual amenorrhea**, **oligomenorrhea**, **menorrhagia**, **metrorrhagia** and **dysmenorrhea**, all as a rule associated with sterility. Results have been reported with irradiation to the ovaries or hypophysis with relatively small amounts of x-rays by I I Kaplan (Am J Obst Gynec 15 658 (May) 1928) and F A Ford and D G Drips (Radiology 12 393 (May) 1929).

The facts can be established only by wide experience and careful subsequent tracing of each patient treated. Some of the matters that require further investigation are as follows. The exact indication of radiotherapy in preference to other therapeutic agents, the most favorable factors in the treatment, the consistence and duration of the relief afforded, and the likelihood or improbability of sequels dangerous to the patient or her offspring.

#### NON-MALIGNANT DISEASES —

**Actinomycosis**—E Ingber (Strahlentherapie 28 581, 1928) carried out some very interesting and conclusive experiments in which he was not able to prevent the spore formation of cultures of actinomyces. The doses of *mesothorium* ranged in gradations from 600 to 10,575 mg-hrs and the maximum effect was only a temporary paralysis but not death to the microorganisms. It was observed that spore formation was decidedly stimulated with small intensities of radiation.

G H Klovekorn and O Gaertner (Strahlentherapie 29 773, 1928) observed almost similar effects of radium on cultures of various kinds with *Staphylococcus aureus*, the *colon bacillus*, and the *Bacillus mesentericus*. Moderate irradiation seemed to accelerate growth while doses sufficiently great to destroy tissues, 5 times in excess of a therapeutic dose, inhibited culture growths temporarily but were never sufficient to kill the bacteria.

**Agranulocytic Angina**—M Call, B H Gray and F M Hodges (Am J Roentgenol 20 550 (Dec) 1928) report the details of the recovery of a case of **agranulocytic angina** with irradiation (x-rays) over the long bones and neck with moderate doses. They quote Friedmann's report of 4 cases successfully treated by irradiation.

Within a few hours after treatment these cases showed a marked increase in the prepolymorphonuclears, a gradual increase in the granular leukocytes and a decrease in the lymphocytes until the blood picture became normal. In the case report by these authors, the white blood corpuscles rose from 1400 to 5800 within 2 weeks.

**Blood Clotting**—Horvath (Am J Roentgenol 21 595 (June) 1929) has carried on extensive experiments concerning the action of x-rays upon the clotting time of the blood, and also upon the stopping of hemorrhages. In a report before the Budapest Royal Medical Society he stated that the method seemed at least worth a trial. The technic which he used is as follows: The patient, with a normal sized spleen and regular displacement, is laid on his right side, resting his left arm pulled high above his head on the treatment couch. Corresponding to the dulness of the spleen a field 20 x 15 cm is exposed to the rays, 25 per cent E S D is given. This irradiation is repeated after 4 weeks. If blood clotting is yet imperfect, the treatment is repeated after 3 more weeks. More than 3 to 4 irradiations are unnecessary in one series of treatments.

**Dermatitis**—H. Bordier (Acta radiol 8 189, 1927) reports a case in which x-ray ulcerations on the lower part of the abdomen, accompanied by severe local pain and impairment of the general condition, developed a few months after x-ray irradiation for a uterine fibroid. He gave the patient *diathermy* treatment for 6 weeks—daily applications with 10 by 12 cm electrodes over each iliac fossa, 1000 ma during a period of 20 minutes. To this were added *emanations with a vacuum electrode* and *carbolic oil dressings*. Complete healing resulted after 4 months.

**Endocrine system**—S. Recasens (Progresos de la clinica 36 163 (Mar) 1928) noted the effects of the x-ray on the genital organs, mammary glands, thyroid, pituitary and suprarenals. The application of x-rays to the upper abdomen causes decrease of epinephrine. Generally speaking, a small dose of x-rays causes activation of the function of endocrine glands, and a large dose produces diminution or complete suppression of the function.

**Fibroids**—J. O. Polak (Am J Surg 6.

648 (May) 1929) states that in 1860 tumors reviewed by Fraenkel, 46 sarcomatous lesions were found. Fibroid tumors rarely develop in women with a perfect endocrine balance. Those lying close to the endometrium, where the circulation is reduced, are apt to cause metrorrhagia, whereas intramural tumors, which grow slowly and often undergo atrophy at the menopause, are more apt to produce menstrual bleeding and at some period in their growth are amenable to radium and x-ray treatment. Menstrual hemorrhage occurs only when the continuity of the endometrium is maintained. When tissue necrosis occurs in overstretched endometrium, intermenstrual bleeding appears. Before radium or the x-rays are used, the exact location and condition of the tumor must be determined. Radium will control the hemorrhage of uterine myomata and, in a large percentage of the cases, will reduce the size of the tumor if it is not pedunculated or subserous. Nevertheless, operation is still the procedure of choice for most myomas.

The disadvantages of radium irradiation are stated as follows:

- 1 Nodules outside of the uterus may remain to give trouble later.

- 2 Malignancy may be overlooked. Unless a diagnostic curettage is done, it is not permissible to use radium in submucous growths.

- 3 Fifty-four per cent of all fibroids are associated with tubo-ovarian disease, and while the local results may be excellent, the associated lesions keep the patient sick.

- 4 A dosage sufficient to stop hemorrhage and shrink the tumor will impair the reproductive functions of young women.

- 5 Fibroids causing symptoms from pressure yield too slowly to radium.

- 6 An inflammatory reaction is excited in old inflammatory adnexal lesions when radium is used.

- 7 Radium adds to whatever necrosis is already present.

The advantages of radium in the treatment of fibroid tumors are summarized as follows:

- 1 There is no operative mortality.

- 2 If radium fails, operation is always possible.

- 3 Menopausal symptoms are less marked.

- 4 Absolute stoppage of hemorrhage may



be expected in all intramural tumors and shrinkage of the mass in 65 per cent of the cases

5 Radium irradiation is the procedure of choice when surgery is contra-indicated

The control of hemorrhage with x-rays was noted by P Pagniez and I Solomon (*Presse méd* 37 281 (Mar 2) 1929), who report 2 cases of metrorrhagia and 1 case of melena, due probably to a duodenal ulcer, cured by x-ray *irradiation of the spleen*. In another case of uterine fibroma irradiations of the spleen were followed by several months of normal menstruation, but gradually the effect of the irradiation decreased, and the treatment was completed by sterilization by means of x-ray irradiation of the ovaries. Therefore, the authors think that in various kinds of hemorrhage x-ray irradiation of the spleen should be tried before radical measures (such as sterilization by x-ray irradiation of the ovaries) are used

Myomas and functional hemorrhages (myopathic, fibrosis, hyperplasia and menorrhagia, etc), according to G M Laws (*Am J Obst Gynec* 17 855 (June) 1929), have shown most satisfactory results and he believes their experience with the results in 94 cases justifies intensive measures to further improve the technic, both radium and x-rays, for these conditions, particularly along the lines of moderate doses and probably at frequent intervals

Uterine fibroids have shown definite and satisfactory response to either x-ray or radium. While both of these agents are useful for the treatment of this condition, patients should generally be selected of the menopausal age or in bleeding women in whom surgery is contra-indicated. F W Lynch (*J A M A* 94 156 (Jan 18) 1930) believes surgery preferable to x-rays in women not of the menopausal age. He thinks artificial menopause is a formidable complication. Submucous fibroids, rather than degeneration of the tumor, hold out greater difficulties in the present management of these cases

There is still room for discussion and study concerning the best mode of treatment of fibromyomas of the uterus, and a final adjustment of the conflicting views will probably never be arrived at, simply because there are types of growths which

should necessarily be operated on and types which can be better treated by radium or x-rays. In borderline situations in which a complete anatomic diagnosis is impossible before treatment is begun, there will always be a divergence of views on proper treatment

In deciding on the type which may properly be operated on or irradiated, anyone will grant that large and hard, necrotic or calcified fibromyomas should be treated by surgical operation, also all those complicated by cystic disease of the ovary of any type, or acute or inflammatory processes in the adnexa with fever. Hemorrhage is probably more to be feared than degeneration, according to F C Wood (*J A M A* 94 601, (Mar 1) 1930)

The statement is not infrequently made by surgeons that fibromyomas of the uterus are often accompanied by other pathological changes in the adnexa, but F C Wood's records of 150 cases at St Luke's Hospital, New York (*ibid*) showed evidence of a chronic process in only 41, and not one example of an acute suppurative lesion was seen

Unless bleeding is a serious factor, these patients can be successfully treated with x-rays and without interference with their usual habits or occupations. Menstruations subsequent to the first series of treatments are frequently accentuated. Usually more treatment is required in younger individuals. There is no mortality from irradiation unless some unforeseen complication develops from causes other than irradiation

In discussing the records of 1443 myomas treated by operation, and 300 cases treated by x-rays and radium, Wood analyzes the advantages of these procedures with surgery and attempts to appraise the benefits and virtues of these procedures

A certain advantage in the use of radium is that in young women, if not more than 1000 or 1500 mg hours is given, menstruation may return and the patients may later become pregnant. The question as to whether such irradiation influences subsequent offspring in an unfavorable way is not yet settled. Certain experimental studies point to the possibility, but there is a considerable body of human material being collected which points to the fact



that the ova are not necessarily permanently injured

In balancing the results of the 2 types of treatment, it is apparent that the advantages of surgery are its certainty in removing the fibroid, the possibility of avoiding sterilization in young women by myomectomy or partial hysterectomy, the relatively low mortality of the operation and the possibility of handling other pathologic conditions at the same time, and of removing the appendix as a protective measure. Against surgery may be placed the mortality, even though low, the fact that the patient is unfit for work for at least a month; the necessary expense incident to such treatment, and the disadvantages of an abdominal scar, with the occasional keloidal hypertrophy or ventral hernia. The last 2 complications do not occur often, but still must be considered in evaluating the treatment

On the side of irradiation, radium being considered first, the advantages are that most fibroids will shrink down considerably, or even entirely disappear, with a single treatment of about 1500 mg hours. Menstruation may reappear after a short period of amenorrhea, in which case the patient may later become pregnant. The disadvantages of radium are that it necessitates hospitalization, for its insertion is a minor surgical procedure since the cervix may have to be dilated, the mucous membrane in contact with the radium is apt to become atrophic later, or an actual constriction of the cervix with pyometra may follow, while the post-irradiation sickness may be just as serious as that following surgical removal. The expense of radium also is considerable

The advantages of x-ray treatment are that the patient is ambulant, the treatments are infrequent, being 1 or 2 weeks apart, they are short, not over 20 minutes each, the patient as a rule does not suffer from any unpleasant post-irradiation symptoms, the radiation action is chiefly on the ovaries, and there is no caustic effect observable on the endometrium, as examination of irradiated uteri has shown. The cost can be made minimal, so that such treatment fits a large proportion of the working population in that they do not lose their positions or their salaries during the treat-

ment. From the economic side, therefore, there is great advantage in irradiation with x-rays. The chief disadvantage of both radium and x-rays is that they produce more or less permanent amenorrhea as a necessary part of the treatment, for the chief effect in causing shrinkage of the fibroid is the absence of periodic hormonal disturbances due to the ovarian activity. No doubt there is some local effect that acts by inhibiting the growth of some of the fibromuscular tissues and diminishing the caliber of the blood-vessels, but the change in the ovary is unquestionably the most important. This is evident from the rarity with which fibroids are seen in autopsies after the menopause has occurred.

It is wholly unnecessary to discuss the fact that irradiation reduces or completely relieves the symptoms due to fibromyomas.

*Nervous diseases*—At the last session of the Gesellschaft der Aerzte in Vienna, Marburg discussed the results of x-ray treatment of nervous diseases. The trials were carried out in collaboration with Sgalitzer. The action of the x-rays lies in the dilatation of the blood-vessels and the resulting hyperemia, which favors healing processes. The destructive action of x-rays in **brain tumors** could be employed with favorable results, as they found that brain itself is in no wise injured by the x-rays. In 150 treated cases of brain tumor, Marburg reported 61 recoveries and 47 with far-reaching improvement through the combination of operation and x-ray after-treatment. In **hypophyseal tumors**, good results were secured by x-ray irradiation alone. Certain types of **headache** can be benefited, whereas genuine migraine is not influenced. In **epilepsy following cranial injuries**, it proved possible to lengthen the intervals between attacks and to reduce their severity. In disorders of the **spinal cord**, it is especially the **tumors** that constitute an indication for the use of x-rays. Eiselsberg was the first to employ x-rays in post-operative sarcoma of the spinal cord, effecting a cure in 2 cases. In inflammatory disorders of the spinal cord, the effects of x-rays were not constant.

Wieser has used x-rays in the treatment of purely mental diseases, particularly **dementia precox**; but a final judgment on

the value of such treatment must be based on more extensive observation

*Plantar Warts*—L R Taussig and H E Miller (Am J Roentgenol 20. 514 (Dec) 1928) reports an experience in the irradiation treatment of 147 plantar warts, 88 cases treated with x-rays and 44 cases with radium, and 15 cases with both radium and x-rays, and states that 80 per cent of the lesions are amenable to radiation therapy. In using radium, a maximum dose should be administered at the first sitting and this should not be repeated more than once. The most satisfactory x-ray dose is an intensive application, followed by 2 subintensive treatments at 2-week intervals. They advise that the keratotic covering be removed before treatment, but bleeding should be avoided.

*Rheumatic Heart Disease*—R L Levy and R Golden (Am Heart J 4 127 (Dec) 1928) treated 30 patients with rheumatic heart disease by x-ray irradiation over the cardiac area. He gave a course of 4 high voltage x-ray treatments to the anterior and posterior chest over the cardiac area, 10 per cent of an erythema dose, and completed treatments in 2 weeks. In 5 of 7 patients paroxysms of severe cardiac distress were relieved. Teleoroentgenograms disclosed no change in the heart size. In no instance was there any aggravation of symptoms from the x-ray treatment nor any unfavorable effect on the course of the disease. Early cases, in the first attack of rheumatic fever, offer the best chance of success in therapy. In a number of cases with low grade infection, predominantly cardiac, it appeared that the infection subsided. The patients did better with prolonged x-ray therapy. They suggest that x-ray irradiation of the heart in rheumatic fever may desensitize the tissues of the heart to an allergizing substance, thereby favoring the subsidence of the existing lesions and preventing further cardiac damage.

*Skin*—Objectionable conditions that are characteristic of many skin diseases are often attributed to treatment with x-rays or radium, says G M Mackee (Am J Roentgenol 20 121 (Aug) 1928). Spontaneous exacerbations of certain diseases are common, topical remedies may cause alarming symptoms, additional affections may develop and a number of dermatoses

have objectionable, disfiguring and even dangerous sequels which may erroneously be attributed to irradiation. The author, therefore, thinks that irradiation treatment should be conducted or supervised by a dermatologist. Its intelligent use requires a thorough training in cutaneous medicine. It is important to know what dermatoses are amenable to irradiation and what the therapeutic response should be. Such knowledge will do much to prevent useless or harmful treatment. If a disease fails to yield to the x-ray or radium in a normal manner, they should be discontinued and all the resources of cutaneous medicine employed to combat the affection. In fact, it is preferable to depend on these resources as much as possible in every case and from the beginning of treatment.

For 2 years J J Eller (Am J Roentgenol 18 433 (Nov) 1927) has employed supersoft rays (*Grenz rays*), which are x-rays of extremely long wave-lengths and large absorption coefficients, in the treatment of numerous skin diseases. Their wave-lengths average 2 Angstrom units and are of such low penetrative power that only a small percentage of them pass through the skin. Results were satisfactory in dermatophytosis, Duhring's disease, basal-cell epitheliomas, particularly of the eyelids, tinea capitis, verruca vulgaris, small keloids when treated early, neurodermatitis and sycosis barbæ. The results were less satisfactory in cases of acne vulgaris, acne keloid, angioma cavernosum, herpes zoster, lupus erythematosus, leukoplakia, parapsoriasis, psoriasis and lupus vulgaris. One case each of paronychia, rosacea, sarcoid and multiple flat epitheliomas was cured.

*Thymus*—J M Barnes (Am J Roentgenol 22 220 (Sept) 1929) reviewed the cases of 69 children treated with x-rays for enlarged thymic conditions, and was not able to demonstrate any deviation from the normal in either the physical or mental spheres after 3 to 8 years.

The symptomatic response of children presenting clinical evidence of enlarged thymic conditions following irradiation—x-rays or radium—is so generally recognized that the procedure is followed everywhere with very prompt and satisfactory remissions. The treatments necessary are moderate, and usually few in number—

generally 2 to 3 The burning roentgenological question at present is the basis of establishing x-ray diagnosis for an **enlarged thymus**, especially when the clinical evidence is atypical Experiences are many in which there is only a very slight widening of the mediastinal shadow in the x-ray film, and yet the clinical evidence of enlarged thymus is marked and the response to radiation is frequently phenomenal On the other hand, the x-ray evidence is frequently phenomenal On the other hand, the x-ray evidence is frequently strong or very suggestive for enlarged thymus when the case is known to be unusually well and totally symptomless from the standpoint of a possible thymus enlargement While there have been many attempts to establish a mathematical size of abnormality, there is still a great deal of variance Clinicians must hold to x-ray treatment for all cases of clinical enlargements, and any case that shows x-ray evidence of abnormal widening of the upper mediastinum, particularly with tracheal compression or displacement (Pancoast and Pendergrass *Am J Roentgenol* (Mar) 1930) This information cannot be obtained satisfactorily without a lateral view of the chest From the standpoint of irradiation, this treatment in thymic cases is now recognized as one of the most satisfactory results in radiological experience

*Tonsils*—Procedure never has received widespread support because tonsillectomy is more certain and rapid Irradiation has been advocated to eliminate operation and complications Aberrant lymphoid structure about the pharynx and base of the tongue, and particularly fragments of tonsil tissue left intact following operation, are frequently amenable to x-rays or radium This procedure is recommended by F H Williams (*Am J Roentgenol* 19 334 (Apr) 1928)

*Trachoma*—There has been much experimental evidence, as well as clinical data, to indicate beneficial results of radium in the treatment of trachoma N S Lipowitz and G G Salzmann (*Fortschr a d Geb d Rontgenstrahlen* 38 359 (Aug) 1928) have found remarkable benefits from the use of x-rays after 2 to 3 treatments, and are particularly enthusiastic about the use of x-rays for trachomatous processes in

children They have no supporting experimental data and do not state whether they treat the eyeball and conjunctiva directly, or whether the rays are directed through the eyelids

*Tuberculosis*—Moderate x-ray treatment to the chest, anteriorly and posteriorly, at frequent intervals, has been recommended as beneficial in various pathological types of tuberculous infiltrations of the lungs by different workers, but the reports have been very fragmentary, and good results in many instances have been inferred and rather suggestive A very comprehensive and conclusive report of the effects of x-rays in 100 cases of **tuberculosis of the lung** was undertaken by R Gassul and S Sandberg (*Fortschr a d Geb d Rontgenstrahlen* 38 488 (Sept) 1928) The cases presented active slowly progressing tertiary, nodular, or nodular-fibrotic lesions All the cases were kept under preliminary observation for 4 to 5 weeks, so as to study the regular clinical course of the lesions and especially the reactive processes produced by the normal immunization mechanism of the organism Not more than 10 to 15 per cent of an erythema dose of high voltage x-rays with 0.5 mm zinc was used

The treatments were given at frequent intervals, according to the condition of the patient Treatment was repeated when no reaction appeared or after the reaction produced subsided The following observations were made with regard to the reaction produced A slight local reaction appeared shortly following the first irradiations, manifesting itself in an increase in the number of râles, prolongation of expiration and crepitation, with elevation of temperature from 0.5° to 1.5°, and a decrease in the sinking time of the blood corpuscles After further irradiation following the subsidence of the first reaction, clinical and x-ray signs of a clearing up of the pathological process appeared At the same time, the temperature dropped to normal, the bacilli disappeared and the general symptomatology (cough, expectoration, night sweats, sleeplessness, loss of appetite, etc) rapidly improved In the cases with exudative pneumonic induration, the first reaction lasted for a period of 1 to 1½ months, there being marked aggravation of all subjective symptoms After the subsi-

dence of the reaction there was only slight and very slow improvement

The longer the intervals between the treatments, the slighter the reactions produced, and the more constant the positive effects of the irradiation. In cases with very small doses, the reaction was negligible so that irradiation could be carried out in an ambulatory way.

### MALIGNANT DISEASE—CANCER

—A biopsy should be performed on every case when possible. If the tumor has been treated by radium or x-rays elsewhere, a careful inquiry as to the extent of the treatment must be ascertained. This will eventually improve the methods of cancer treatment by irradiation and establish a rational basis for estimating results that possibly another laboratory has not been able to adjudge after painstaking endeavors over long periods of time, and lose the only important facts to be obtained through the fatal outcome of the case—the results of the particular technic employed. An improper first treatment may render a neoplasm incurable by irradiation. Regaud (Ann Surg 90 15 (July) 1929) believes that x-rays are usually not successful after radium has failed. This is not the general impression, because the author has frequently observed results from x-rays after

of breast cancer with radium after failure of apparently adequate x-ray treatment.

E. Berven and J. Heyman (Acta radiol 9 497, 1928) report upon the results of radium treatment in over 500 lesions. All cases treated at Radiumhemmet during the period from 1921 to 1927 are included. There are 4 tables. Table 1 gives the data on the cases treated with radium in the period from 1921 to 1927, and Table 2 the data for cases treated with electro-endothemy and desiccation in the year 1927. Table 3 deals with the cases of cancer of the cervix of the uterus treated in the period from 1914 to 1927, and Table 4, with those of cancer of the body of the uterus treated in the period from 1913 to 1927.

In all, 14,608 persons applied for treatment, 5,592 were not suitable for treatment, 906 abandoned treatment, 251 have been treated only recently, 1225 were not benefited, 4100 were rendered symptom-free, 160 were symptom-free at the time of death from other causes, 139 were symptom-free for a time and then developed a recurrence and were re-treated without benefit, 734 were benefited, and 209 were benefited temporarily, their condition thereafter becoming hopeless.

The results were as follows

Condition	Cases	Rendered Symptom-free	Benefited	Not Benefited
Tuberculous glands	240	166	69	4
Cavernous hemangioma	292	128	161	3
Chronic tonsillitis	496	394	90	9
Cancer of the lip	141	111	3	17
Cancer of the vulva	45	14	1	27
Metropathia	123	120	1	2
Myoma	152	140	2	9
Eczema	68	46	12	0
Verrucæ	1187	1113	40	19
Cancer of the skin	487	419	7	24
Cancer of the eyelid	112	104	3	1
Hyperthyroidism	35	26	16	2
Basedow's disease	51	26	19	2
Cancer of the breast	61	15	4	26

apparent failure from the use of radium and *vice versa*, but these failures were probably the result of inadequate treatment—insufficient dosage, rather than the particular agent employed. Various experiences have shown regressions of local recurrences

Of the patients with cancer of the cervix of the uterus, 38 per cent were free from symptoms after 1 year, 29 per cent after 6 years, 19 per cent after 7 years, 17 per cent after 8 years, 16 per cent after 9 years, and 12 per cent after 10 years.

Of those with cancer of the body of the uterus, 70 per cent were free from symptoms after 1 year, 69 per cent after 2 years, 64 per cent after 3 years, 58 per cent after 4 years, 55 per cent after 5 years, 55 per cent after 6 years; 58 per cent after 7 years, 44 per cent after 8 years, 29 per cent after 9 years, and 22 per cent after 10 years

*Antrum*—C Regaud (Am J Roentgenol 21 1 (Jan) 1929) reports 18 cases of carcinoma of the antrum treated by a combination of *surgery* and *radium*. Six of 18 patients treated have been symptomatically free of disease for 3 years. One case died of cervical metastasis after a complete cure of the primary lesion

At the Curie Institute of Paris, Regaud used wax moulds (Columbia paste—made with beeswax and sawdust). By heating to body temperature by immersing in warm water, any form or angle, particularly about the jaw and neck, can be made, and radium capsules attached, so that continuous radiation for 24 to 200 and 300 consecutive hours may be administered. By this method weak intensities for long periods of time are used for the purpose of radiating cells at different stages of division, during which time the sensitivity to radiation is greatest

*Bladder*—In selected cases the ideal procedure is *electro-desiccation* of the growth and implantation of *radium needles* into the base. If the disease is extensive, the success of this treatment is not brilliant. The results of radium and destructive treatments through a cystoscope have been very fragmentary and usually not complete. This procedure has been largely palliative. Papillary growths are usually very sensitive to radiation, and the clinical response with high voltage x-ray therapy has been very gratifying. Many of these cases are rendered symptom-free as long as 1 to 3 years, even in advanced cases—as far as this degree of involvement can be determined cystoscopically

C A Waters (Radiology 13 109 (Aug) 1929) regards the location of the tumor as important in its successful treatment. In papillary carcinomata, a combination of *fulguration* and applications of *radium* in his experience, employing a cystoscopic radium applicator, has proved satisfactory, but in a large majority of these cases it is ex-

tremely difficult to determine whether a tumor is superficially infiltrating or not. In the infiltrating lesions the fulguration and radium are supplemented by deep *x-ray* therapy. This is the method of choice in the infiltrating ulcerating carcinomas of the bladder. In certain instances the location and extent of involvement determine surgical excision

*Brain*—A Bécclère (J de radiol et d'électrol 13 209 (Apr) 1929) discusses the radiation treatment of brain tumors and has observed a great radioresistance. In the gliomas an operation is only seldom complete. He believes that in most cases operation is limited to biopsy or incomplete removal and that, therefore, all gliomas should be given post-operative treatment. He observed reactions from the radiation from a few hours to several days after treatments, and in some instances the radiation reactions appeared as late as 10 to 14 days. Headaches, nausea, vomiting, visual disturbances, paresis, and occasionally spasmodic contractions have been effects noticed after radiation of brain tumors. P Bailey, M C Sosman and A Van Dessel (Am J Roentgenol 19 203 (Mar) 1928) attempted to classify brain tumors, particularly the gliomas, according to their radiosensitivity, on the basis of microscopic examinations, and found that the cases showing the shortest life (medulloblastoma) were more radiosensitive than the ones with the longest life duration (protoplasmic astrocytoma) showing marked radioresistance. They also feel that irradiation of gliomas should be attempted only after surgical procedures (removal or decompression), since all that can be expected from radiation therapy, in their opinion, is an arrest of the lesion with consequent prolongation of life. They found many reports of cases in literature where radiation therapy was applied primarily without even decompression, and with very satisfactory results both with regard to improvement in the symptomatology and reduction in the intracranial pressure

H K Pancoast (Am J Roentgenol 19 1 (Jan) 1928) reports satisfactory benefits in many instances to justify consideration of radiation procedures, and while the end results to date have not been generally brilliant for a large group of these cases,

improved technic should be given every opportunity

H Magnus (Arch f Ophth 121 225, 1928) observed the results of x-ray treatment in 22 cases, with very marked improvement in 11 cases. The improvement occurred, both in the vision and in the visual field, and was especially pronounced in the cases with **acromegaly**. He holds that acromegaly is due to a benign eosinophile adenoma of the anterior lobe of the pituitary gland, which, as a rule, is highly radiosensitive. In 11 other cases the tumors were cysts, carcinomas, endotheliomas, etc., and no response to radiation was obtained. This author calls attention to the immobility of the temporal portion of the pupil which was observed in 3 cases with amaurotic eyes. No satisfactory explanation of this could be given and nothing was found in the literature to account for it.

**Breast**—Cancer of the breast when compared with other regions of the body is fairly radioresistant. One constantly sees those cases in which radiation of various types has been totally ineffective in either slowing-up the progress of the disease or in preventing metastasis. In fact, the majority of the breast carcinomata belong to this group, according to F E Adair (Radiology 13 319 (Oct) 1929).

According to G E Pfahler and B P Widmann (Am J Roentgenol 21 546 (June) 1929), recurrent cancers of the breast with glandular and mediastinal metastasis show a post-operative life of 45 months with irradiation, as compared with 27 months when surgery alone is used. Inoperable primary cases show an average life of 54 months when treated by radiation, as compared with 34 months when no treatment is given. An average of the statistics from 10 clinics in which surgery and irradiation were used, showed 58.3 per cent three-year and 43.2 per cent five-year cures, as compared with the surgical results alone in 33 clinics in which there were only 38.6 per cent three-year and 28.8 per cent five-year cures. The writers, therefore, recommend irradiation in all cases of cancer of the breast, with or without surgery, according to the indications.

Keyes (Brit M J 2 1119 (Dec 14) 1929) spoke of the difficulty of obtaining any true comparison between the results in

carcinoma of the breast obtained by surgery and those obtained by radiological methods. Hitherto, radiology had been reserved for special classes of patients, such as those who refused operation, those who were ordered prophylactic treatment after operation, those treated for recurrences, and the hopelessly inoperable. About 8 years ago he began treating by radium those who had recurrence after operation. It soon became apparent that, by the implantation of a small dose of radium for a considerable time, the local recurrence could be made to disappear completely. After this result, it seemed logical to suppose that equal success would be obtained locally in an unoperated carcinoma, therefore, he began to treat primary carcinomata which were regarded by the surgeons as inoperable. Since that time he had gone on steadily increasing the number treated by radium alone. Up to the present, he had a series of 145 cases at St Bartholomew's in which radium had been employed in primary carcinoma of the breast. At the end of 1928, 67 patients had been so treated, followed up, and recorded, a good result had been obtained in 45 out of the 67, and about half of these had been described as "apparently cured" for periods extending to 2½ years. Of the 67 patients treated, 26 were inoperable, and a good result had been obtained in 12 out of 26, half of whom had been—to use the cautious phrase—apparently cured. Keyes added that he was sure there was a field for x-rays in supplementing the effects of radium.

**Cervix**—G G Ward (Am J Obst Gynec 17 1 (Jan) 1929) discusses a paper presented before the Scandinavian Surgical Society in June, 1927, by Heyman, which he considers the outstanding contribution to recent literature on the subject. Heyman omits all doubtful statistics, does not deduct intercurrent deaths and untraced cases, and quoted only five-year cures. His results are summarized: Operative cures of all cases, 18 per cent, with irradiation treatment, 16.3 per cent. The operative results for operable and borderline cases was 35.6 per cent as compared with 34.9 per cent by radiation alone. Operative mortality, 17.2 per cent as compared with 2 per cent with radiation. From 1914–1921, Forssell and Heyman reported from the

Radiumhemmet at Stockholm, 22.4 per cent of 502 cases treated radiologically as five-year cures, the operability percentage here being 29.1 per cent. Of 145 operable and borderline cases, 44.4 per cent showed a five-year cure.

The Woman's Hospital, in 1925, reported 2 series of irradiated cases with 23.6 per cent of five-year cures for all cases and 52.9 per cent for operable and borderline cases.

F. Voltz (Arch f Gynak 136 213 (Apr 24) 1929) divides the carcinoma cases into 4 groups, according to the extent of involvement. Of 1319 traced cases, 227 were early operable cases and 92 or 40.5 per cent were cured. Of 310 borderline cases, 69 or 22.3 per cent were cured. Of 553 inoperable cases, 58 or 10.7 per cent were cured. Of 239 incurable or hopelessly advanced cases, 3 were symptomatically cured. All of these cases were treated by irradiation.

*Lip*—Lip cancers are classified as superficial and infiltrating, according to G. Forssell (Acta Radiol 9 315, 1928). In cancer of the lower lip the difference in the results in the 2 types of tumor was marked. Of cancers of the superficial type, 90 per cent were cured, whereas, of the cancers of the infiltrating type, only 34 per cent were cured. Of the infiltrating but technically operable cases, 75 per cent were cured. Of 20 cases of cancer of the lip, 70 per cent were cured. All of 11 superficial tumors remained cured. None of the infiltrating cancers of the lip or skin with inoperable glandular metastasis were cured by radio-therapy, but a clinical cure was obtained in 3 cases of local infiltrating recurrences which developed after the operative removal of a lip cancer without glandular metastasis. Operable glandular metastases were extirpated.

*Leukemia*—Chronic myelogenous leukemia is sometimes classified with lymphoblastomas, produces progressive anemia, enlargement of the spleen, and degenerative hypertrophy of the bone marrow, and results in an increase of immature leukocytes in the circulation. Various observers quote the average duration of life as 1½ to 2½ years (Renon, Degrais and Dubois, Beclere, Halthusen, Vogel, Cabot, cited by E. T. Leddy, Am J Roentgenol 21 250 (Mar) 1929). It is well known that radio-

therapy—x-ray and radium—in properly selected cases brings about striking remissions of symptoms, so that patients who may be in distressing or even serious condition can be returned to a useful functionally efficient existence. G. Forssell (Wien klin Wchnschr 27 221, 1914) states that definite improvement resulted in 90 per cent of the cases. This improvement manifests itself not only in the blood, but in the phenomena secondary to leukemia, especially in the splenic tumor, and the general condition as a whole.

Most authors of wide experience in radiological procedures hold that 50 per cent of patients will show remissions sufficient to render the patient symptom-free and able to work to almost complete capability, whereas in non-irradiated cases, remissions occur in only about 6 per cent. Leddy reviewed the literature extensively and finds that experiences largely tend to moderate doses of x-rays or radium, and sometimes both, and that large or intensive doses are reserved for treatment of the inevitable stage of refractoriness, which is very often the pre-terminal stage of the disease.

There is a great deal of controversy among radiologists about the better plan of procedure—treatment of long bones, or treatment confined to the spleen. The consensus of opinion agrees to equally good results from treatments directed over the spleen or long bones. In scattered areas, there is much weight in favor of holding off the treatment over the long bones until there is beginning evidence of refractoriness. At this stage the intensity of the treatment must be increased, and this larger dose is more tolerable over the region of the extremities in a patient beginning to lose strength, than it would be over the splenic and abdominal region.

*Mouth*—Radiotherapy was given in 244 cases of oral cancer at the Radiumhemmet in Stockholm (G. Forssell, Acta Radiol 9 315, 1928). Some of these cases were also operated upon. Of 160 cases given irradiation treatment alone, 19 per cent were cured after 1 year, and of 113 cases, 18 per cent remained cured after 5 years. Permanent cure was obtained only when the lesion was microscopically limited to its primary site. In none of 72 cases with glandular metastases was even a one-year



cure obtained. However, the glandular metastases were very extensive and infiltrating and the patient's general condition was so poor that only a palliative effect was attempted. In the inoperable cases with glandular involvement only x-ray therapy was used.

Regaud found the most favorable results in the radium treatment of cancer of the tongue and floor of the mouth when the lesion involved the anterior half of the dorsum and borders. Of 367 cases, 185 involved this region, and 26.4 per cent complete cures were obtained. To this may be added 24 per cent more of the patients whose primary tongue lesion was cured while the metastatic glands were not so influenced. This makes a total of 51 per cent of eradication of the primary lesion without consideration of failure to arrest the growth of metastatic node deposits. (C. Regaud, *Am J Roentgenol* 21:7 (Jan) 1929). The posterior half of the dorsum of the tongue (pharyngeal region), the infralingual region, and the floor of the mouth are less favorable, 19.5 per cent of 82 cases involving the posterior dorso-lingual region were cured completely. In 77 cases of infralingual involvement, 22 per cent were completely cured, and 33.7 per cent cures of the primary lesion were obtained without effecting a regression of the metastatic nodes.

Of all cancers of the tongue and floor of mouth 367 cases, 24 per cent complete cures were obtained, and 44 per cent cures of the primary lesion only. Regaud emphasizes that the above figures are based on cases of which only 20 per cent were operable when submitted to the treatment. He does not advise the treatment of invaded glands by radium puncture. At present a *radical block dissection* of the area in which suspected or positive glands are present is carried out. This is followed by radium therapy at a distance of 5–8 cm from the skin, if histological examination of the removed glands corroborates the diagnosis of cancer.

Before treatment is started the teeth are cleansed or extracted if badly decayed. Infections about the alveolar process are treated locally. Frequent cleansing of the mouth with sodium perborate or liquor antisepticus alkalinus is advantageous. While

radio-active foci are in the mouth, gauze is interposed between the teeth, tongue and cheek for the purpose of avoiding the influence of secondary radiations given off by the teeth. Regaud (*ibid*) holds to the following principles in the treatment of lingual cancers: (1) To distribute numerous and weak radio-active foci in the whole of cancer-bearing area and immediate surrounding tissues, having care to create a radiation field as homogeneous as possible, (2) to use the gamma rays only in order to avoid a necrotizing effect, (3) to give a continuous irradiation for a long time, reducing thus both the intensity and the dose, (4) to expect success from but a single treatment, in order to avoid auto-immunization of the neoplasm against radiations. The principal causes of failure in this method of radium puncture of the tongue are recited by Regaud as follows: (1) A too narrow estimation of the cancerized area, (2) the want of accuracy, especially in the places difficult to reach (*e g*, in the pharyngeal part of the tongue), (3) an insufficient global (total dose), or too much inequality in dealing with needles, (4) an imperfect material of the needles, (5) radionecrotic accidents.

According to Regaud, radionecrosis is caused by: (1) the excess of the global (total) dose, (2) the excess of the dose in a limited area, resulting from a few needles being wrongly placed, (3) the repetition of the treatments, (4) a too weak screening, (5) the simultaneous association of radium puncture and of strong irradiation from an external source.

*Parotid Tumors*—B. F. Schriener and W. L. Mattick (*Am J Roentgenol* 21:541 (June) 1929) analyzed the results of 66 cases of salivary gland tumors and submit the following conclusions. Two cases of carcinoma of the salivary glands are alive and well 2 years after treatment by operation and high voltage x-rays, one case for 7 months. Where the tumor is favorably located, complete operation or removal of the tumor from its capsule, followed by irradiation is the method of choice. Irradiation by implantation with emanation, radium packs or high voltage x-rays is preferable when the tumor is not favorably located for operation. Post-operative recurrences of salivary tumors are best treated by ir-



radiation In arriving at these conclusions they took into consideration the chronicity of the mixed tumors and have endeavored to be conservative in the evaluation of the method of choice

*Prostate*—Only the cases of carcinoma of the prostate that cannot be radically and completely removed surgically, with the hope of cure, should be treated by deep x-ray therapy and radium Unfortunately, many cases show wide involvement, perivesical infiltration and even pelvic and bone metastasis when first seen by the radiologist, and even the surgeon In cases with this extent of involvement, *high voltage x-rays* and *radium pack* treatments (gamma rays) offer the most from the standpoint of palliation Bladder irritation and pain are greatly relieved Occasionally radium intravesically (cystoscopic radium applicator) has been beneficial in selected cases but the risk of increasing bladder tenesmus is great because of the large intensity of radium necessary

*Penis*—G E Pfahler and B P Widmann (Am J Roentgenol 21 25 (Jan) 1929) found that *epithelioma* of the penis could be cured by surface (contact) applications of *radium* in reasonably early cases When the lesion is extensive and especially of the infiltrating ulcerating type, the radiation must be supplemented by *high voltage x-ray* therapy to the groins (inguinal glands) and followed within 2 to 3 weeks after completion of this treatment by a simple *amputation* If the inguinal metastasis is not present at the start of the treatment then simple amputation offers excellent

chances of cure Dissection of the inguinal glands with high voltage x-ray to this region is not necessary The fungating type of growth is very radiosensitive The reason for ultimate failure of radium in extensive lesions is the fact that, to give sufficient radiation to completely eradicate a lesion of great involvement, such a large intensity of radiation is necessary that a radiation necrosis will inevitably occur, and this will be complicated with a mixed infection that will eventually necessitate amputation A L Dean, Jr, (Am J Roentgenol 15 36 (Jan) 1926) estimated the radium dose with 1.5 mm silver filter to be approximately 60 mc-hr for each square cm of tissue (surface)

If the inguinal metastasis is present at the start of the treatment, then the best procedure is conservative treatment, which is radiation only, and in many instances complete regression of the involved glands has been observed

*Stomach*—H Holfelder (Strahlentherapie 33 131, 1929) reports good results from the x-ray treatment of carcinoma of the stomach, even though the glands show metastases He does not believe treatment is contra-indicated even though lesions are extensive Involvement of the cardia and pylorus in his cases was equally amenable The scirrhus carcinoma was more resistant than the medullary type He claims now to have a number of carcinomas of the stomach free of signs of recurrence for more than 2 years after irradiation, 2 of which he describes

## Y

**YAWS.**—Up to a certain limit, the so-called motility of the *Treponema pertenue* may be employed as an indication of its viability, states K Yasuyama (Philippine J Sc 35 333 (Mar) 1928) The viability of the organism outside the body was found to be of slight duration The temperature of the human body (37° C.—98.6° F) was observed to be more

favorable to the survival of the organism than the room temperature (average 28.5° C.—83.5° F) At low temperature (0° to 5° C.—32° to 41° F) the period of viability was very limited (less than 30 minutes), a state of affairs given as one of the factors in explanation of the fact that yaws will not gain a foothold when introduced into cold countries.

Yaws, according to P H Manson-Bahr (Brit J. Ven Dis 4 44 (Jan) 1928), is a disease closely allied to syphilis in its etiology, pathology and treatment, but differing from it mainly in its method of conveyance, lack of hereditary transmissions, and its response to treatment.

There are, as in syphilis, 3 stages—primary, secondary and tertiary—and a positive Wassermann reaction is obtained. A community suffering from yaws seems to be relatively immune from syphilis, as is shown by the fact that among natives in Fiji, Tonga and Samoa, who are especially prone to yaws, the writer has never seen a case of chancre, or of secondary syphilis. He states that tabes and general paralysis are unknown, but there is good evidence that both diseases may occur in the same individual, and that yaws may die out in a country while syphilis remains.

**TREATMENT**—Yaws has been found to respond very readily to neosalvarsan. In the secondary stage, 1 injection suffices, and even in tertiary lesions, not more than 3 injections, are necessary. It cannot be cured by potassium iodide and mercury, but bismuth has been found to produce very good results, especially in mass treatment.

**YEAST.**—It would hardly seem necessary to review the recent findings on yeast in view of the voluminous opinions which have been spread in the public press from eminent clinicians both here and abroad. Yet perhaps a few citations from actual experiments may not be amiss. C Kennedy and L S Palmer (J Biol Chem 83 493 (Sept) 1929) report that a highly purified ration pre-

sumably adequate, except for vitamin B, is made adequate for growth when dry starch-free yeast is added. It is not made adequate when the source of vitamin B is a concentrate from pure dry yeast or its residue, or autoclaved yeast is added. From other tests the conclusion is made that yeast contains some factor other than vitamin B or the anti-neuritic factor, and this is necessary for satisfactory growth.

A Seidell (J Biol Chem 82 633 (June) 1929) reports a further purification from yeast of the anti-neuritic concentrate. This is done by benzylation in alkaline solution and chloroform extraction. The water solution after extraction when poured in ten volumes of acetone, gives a precipitate of salts and a nitrogen carrying compound. When doses of this containing 0.15 mgr of nitrogen is added to a diet of polished rice, it protects pigeons from loss of weight. On the basis of nitrogen content this purification product of anti-neuritic material shows an activity more than 100 times that of dried brewers' yeast.

R R Williams, R E Waterman and S Gurin (J Biol Chem 83 321 (Aug) 1929) attempted to separate vitamin B (the anti-neuritic essential) from vitamin B<sub>2</sub> (the P-P or growth essential) in yeast by autoclaving at different hydrogen-ion concentrations. They found that the pH of the yeast is an important factor in bringing about the destruction of B, in autoclaving. When brewers' yeast is autoclaved at its natural acidity for six hours at 15 pounds pressure, the removal is incomplete. The B<sub>2</sub> factor is also destroyed unless the autoclaving is done at high acid

concentration Alkaline reaction is largely destructive.

Since yeast has become such a common article of diet, the report of E. U. Still and E. M. Koch (Am. J. Physiol. 85.33 (May) 1928) on the effect of yeast on metabolism is particularly *apropos*. They found that yeast has little effect on nitrogen metabolism. Most of the added yeast nitrogen is excreted in the feces. But little effect on phosphorus metabolism also is exhibited and the path of excretion of the yeast phosphorus was the alimentary tract. Apparently the protein of yeast is not well utilized.

No change in blood uric acid accompanies yeast ingestion from which the conclusion is made that there is no uric acid retention due to its inclusion in the diet. Yeast ingestion only carries an increased uric acid excretion when the level is already high. When yeast is discontinued, the increased amount of uric acid excreted promptly drops off. A reduction in urinary phenols (indican) occurs when yeast is added to the diet. This is to be taken as an indication that yeast changes the type of intestinal flora and causes a diminution in the putrefactive type of organism. No consistent changes in moisture content of the feces is brought about by yeast in the diet. On the other hand, evacuations are easier because of the greater bulk and porosity due to fermentation. Finally W. H. Griffith (Proc Soc Exper Biol Med 26 858 (June) 1929) notes that the plentiful addition of yeast to the diet increases in rats the utilization of food and the detoxification of sodium benzoate.

**YELLOW FEVER.—ETIOLOGY.**—Martini (J. Exper. Med 47: 255 (Feb) 1928) observed in his studies the extraordinary duration of life and relatively meager requirements for sustenance of *Leptospira icteroides*. He states that it may be possible, after a lapse of years, for an outburst of yellow fever to occur without introduction from outside.

A. Agramonte (Ann Int Med 1 977 (June) 1928) contends that the causative agent of yellow fever has not been demonstrated as yet. The claims of Noguchi and his disciples for *L. icteroides* as the specific germ of yellow fever have been conclusively disproved.

The African and Brazilian strains of yellow fever virus, as tested by N. C. Davis (Jour Exper Med 49 975; 985 (June 1) 1929), while showing differences in virulence and behavior, are immunologically the same.

**PATHOLOGY.**—D. E. Cannell (Am J Path 4 431 (Sept.) 1928) did a microscopic examination and analysis of the hearts in 29 cases of West African yellow fever and 9 monkeys infected with the same. Cloudy swelling, granular and fatty degeneration were found constantly. Primary inflammatory changes were not seen. Secondary response of white cells to intense degeneration was observed in 2 human cases. The distribution and intensity of granular and fatty degeneration was patchy and variable. Fatty degeneration was most marked in the neighborhood of the nuclei of the fibers. The heart lesions alone are not sufficient to justify a diagnosis of yellow fever.

The liver cells containing the acidophil nuclear inclusions, first described by Magarinos Torres in yellow fever,

are shown by W. H. Hoffmann (Arch. f. Schiffs- u. Tropen- Hyg. 33: 411 (Aug) 1929). He explains that they are most frequently found early in the disease. The inclusions are apparently produced by a degeneration of the nuclei, but it is possible that the degeneration is caused by the penetration of the causal microorganisms into the nuclei of the liver cells where they remain in the inclusions.

The coagulability of the blood in yellow fever was studied by J. Velard (Brasil med 43 588 (May 25) 1929), who found that on the second day of the disease, in all patients, there was a steady diminution. It reached a minimum about the seventh day and returned to normal with convalescence.

**DIAGNOSIS OF ENDEMIC TYPE**—W. H. Hoffmann (Am J Trop. Med 8 563 (Nov) 1928) emphasizes the fact that the diagnosis of endemic yellow fever is not as easy as that of the severe epidemic disease, though the former is even more important for the survey and control operations, which in the endemic centers always have to be preceded by exact diagnostic work if they are to be effective. An opinion on the definite results of the hygienic measures can be found only if the diagnostic service is based on completely reliable methods. With great care and experience on the part of the responsible authorities, it will often be possible, in spite of all the difficulties, to make the clinical diagnosis in suspicious cases, if each patient with

fever is especially examined for the possibility of yellow fever until the nature of the condition is clear. As long as the clinical methods are insufficient and bacteriologic methods do not exist, the anatomic diagnosis is decisive and should be made in all persons who die in the endemic territory from suspicious infections, or in mild cases in the monkeys infected with the blood of such patients. This is probably the quickest and most reliable way to prove beyond any doubt the presence of endemic yellow fever in a given area.

**PROPHYLAXIS**—Protection tests with serum of persons recovered from yellow fever have been carried out by N. P. Hudson, J. H. Bauer, and C. P. Philip (Am J Trop Med 9 1 (Jan) 1929). They noted that recovery from an attack of yellow fever induces an immunity transferable to *Mococus rhesus*. No relation was determined between the protection ability of human serum and the time elapsing between the illness and the test.

*Noguchi's vaccine* is stated by G. Pittaluga (Siglo méd 81 221 (Mar 3) 1928) to be unreliable, as all recent work seems to disprove the etiologic rôle of *Leptospira icteroides*.

*Yellow Fever Vaccine*—Experiments on monkeys have convinced E. Hindle (Brit M J 1 976 (June 9) 1928) that phenol glycerin vaccine, prepared from the liver and spleen of infected monkeys in the manner described, is likely to afford a simple means of protection against yellow fever in human beings.

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